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AND

COAL

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IN closing its forty-second volume, the ENGINEERING AND MINING JOURNAL greets its patrons and readers with the compliments of the season and with the warmest wishes for joy and prosperity to each. Not a few of these good friends have been our readers now for more than twenty years, and we trust will continue to read and have cause to approve our work for twenty years to come.

THE success of the Cowles electric smelting process for the reduction of aluminium, to which we have so frequently referred, appears to have passed far beyond the experimental stage since the starting up of the great dynamo, illustrated and described in the ENGINEERING AND MINING JOURNAL, September 11th last. The working of this machine has proved so satisfactory that two additional dynamos of the same force have been contracted for, the present capacity of the works being unequal to the demand for their product. The use of aluminium alloys for guns is attracting a good deal of attention, and every process that tends to the cheaper production of aluminium is of the greatest interest and importance.

WATER-GAS.

We have so often called attention to the claims of water-gas as "the fuel of the future" that our readers are somewhat familiar with the subject. The introduction of natural gas has greatly promoted the interests of water-gas; for it has demonstrated the advantages of gas over solid carbon as a fuel, and by educating people up to an appreciation of these advantages, has prepared the way for the adoption of that cheapest and most concentrated form of gaseous fuel, water-gas, when the temporary supply of natural gas has given out, and its present use where natural gas is not obtainable.

The great anthracite culm-banks of Pennsylvania, which have accumulated as unsightly and expensive hills, can, to a great extent, be converted into the cheapest and best form of fuel, which can be transported to the centers of consumption through large mains at a cost, delivered to the consumer, far less than that of coal, for equal service.

The plans of Professor LOWE, that indefatigable pioneer in this most important field, to accomplish this end, are worthy of the most careful attention, and we trust we shall yet see our seaboard cities heated by that clean, efficient, and inexpensive fuel. When this has come about, it should not be forgotten that the credit will be due to Professor LOWE more perhaps than to any other one person.

C. SHALER SMITH.

We regret to learn of the death of this distinguished engineer at his home in St. Louis on the 19th inst.

Mr. SMITH was a native of Maryland, and after completing his professional studies, he devoted his attention to civil engineering. He early exhibited great aptitude in bridge building, and was frequently employed in the construction of railroad and other bridges. He was most successful in all his operations; and when it was decided to bridge the Missouri at St. Charles, he was selected to superintend its construction. His management of this difficult undertaking, and the excellent manner in which he adapted means to ends and brought the task to a successful conclusion, attracted general attention.

Mr. SMITH also assisted Captain EADS in the designing and construction of the St. Louis bridge, and was recently engaged in building the Canadian Pacific Railway bridge over the St. Lawrence, near Montreal.

Some four or five years ago Mr. SMITH received a fall, from the effects of which he afterward suffered and finally died; but his death at the comparatively early age of fifty years was undoubtedly hastened by his indomitable energy, which would not allow him to take needed rest.

Mr. SHALER SMITH has for many years been looked up to as one of the most able and distinguished members in the profession, and especially in that branch of the profession in which American engineers stand unrivaled. In addition to his great ability and technical skill, Mr. SMITH was universally esteemed as a man of sterling integrity and spotless honor; an ornament to his profession and a worthy example of the American gentleman.

NEW APPLICATION OF ELECTROLYSIS TO THE DESILVERIZATION OF LEAD.

A German patent has been issued to the Prussian government leadworks at Tarnowitz, in Silesia, for a new process of treating the argentiferous zinc crusts and skimmings electrolytically. Heretofore, this "alloy" has most generally been worked further by distilling off the greater portion of the zinc it contains and obtaining a residual rich silver-lead, sufficiently free from zinc to be submitted to cupellation. This distillation of a material consisting of over 80 per cent of lead is a very troublesome operation, and though it is carried on with satisfactory results, still it remains the most difficult and expensive operation in the otherwise excellent process of desilverization by zinc. The new process under consideration appears to offer many advantages that promise to make its introduction and adoption soon general. It is as follows: The zinciferous silver-lead is first reduced to wheat size, and is then placed in a wooden vat, the bottom of which is covered with sheet-lead. The vat is filled with an electrolyte liquor of sulphate of zinc, and a cathode plate of metallic zinc is suspended in the liquor at a suitable distance from the bed of alloy. This cathode is connected with the negative pole of a dynamo, the positive pole of which is connected with the lead bottom of the vat on which the alloy rests. By the action of the current, zinc is deposited on the cathode, and an equivalent portion of the zinc in the alloy is dissolved out. If this could be carried on till all the zinc was removed, the process would be perfect, as all the zinc would be regained for use over again, and the residual silver-lead would be ready for cupellation. It is found that the amount that can be so dissolved out depends entirely on the surface exposed, the solution acting very slowly as the depths of the pores increase. When the electrolytic action becomes very weak and almost ceases, the bed of material is taken out, washed, and placed o[illegible]earth of a liquating furnace. The exterior

of the granules, being now entirely free from zinc, the silver-lead is easily liquated down to the point where the unattacked alloy once more appears on the surface. The lead obtained from this operation is, of course, ready for cupellation. The residuum is once more granulated and replaced with fresh material in the vats, and subjected to electrolysis, until the lead again increases so far in proportion to the zinc as to make it profitable to again liquate it. In this manner, the two processes alternate, until the separation is complete. While at first sight, this constant rehandling of the material appears to offer serious objections, still in practice it has proved much cheaper, both as to fuel used and in the increased saving of metallic zinc, than the distillation processes heretofore in use. By reducing the size of the grains as far as compatible with the circulation of the sulphate liquors through the mass, the number of times the alternating operations take place may possibly be reduced to two or at furthest three, and doubtless before long the strength or even composition of the bath will be so regulated that the whole process of dezincifying may be completed in one operation.

CORRESPONDENCE.

[We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.]

Comparative Efficiency of Spray and Surface-Cooled Air-Compressors.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I am sorry that Mr. Saunders withdrew just at a point where the discussion was becoming interesting, and I can assure him that it afforded me great pleasure to republish his air cards of October 30th, and, what is more, I do not think I misunderstood them. If Mr. Saunders will carefully look them up, he will see that, at a pressure of 60 pounds by the gauge, or about one inch before the discharge-valves opened, card No. 2 showed an increase of temperature of 173 degrees and only 163 degrees at the line of discharge. If to the latter, you add the initial temperature, we shall get 233 degrees, while the thermometer in the discharge-pipe showed but 108 degrees, or 125 degrees less than the card shows. This will correct the error of saying that the *card* only showed 108 degrees, as is intimated by Mr. Saunders in his last letter.

I produce herewith two diagrams, both of which are very good cards, and they will readily convince your readers of the utter unreliability of judging of the efficiency of an air-compressor by the temperature of discharge-pipes.

Card A is from a Rand Class "A" air-compressor, having the piston and rod circulation of water shut off. From the card, we find that the increase of heat to the line of discharge is 245 degrees; add the initial temperature, 72 degrees, and we have a total heat of 317 degrees, or 15 DEGREES MORE THAN WAS SHOWN BY THE THERMOMETER IN THE DISCHARGE-PIPE.

Card B is from an Ingersoll air-compressor with spray injection. Here we see that the increase of heat to the line of discharge is 294 degrees; add the initial temperature, 73 degrees, and we have a total heat of 367 degrees, or 265 DEGREES MORE THAN WAS SHOWN IN THE DISCHARGE-PIPE.

Taking Card B as a fair sample of many in my possession from different Ingersoll compressors, and known to Mr. Saunders to be a fair average of their performance, I can see no reason why my experiments and jets should be made a target for ridicule.

Before retiring, I am anxious to return to Mr. Saunders my thanks for his vivid description of what takes place in the interior of a compressor. "The advancing piston first produces a blast of wind, then a violent agitation and increasing density of medium." This equals the sublimity of Milton, when

> "On a sudden open fly,
> With impetuous recoil and jarring sound,
> The infernal doors, and on their hinges grate
> Harsh thunder."

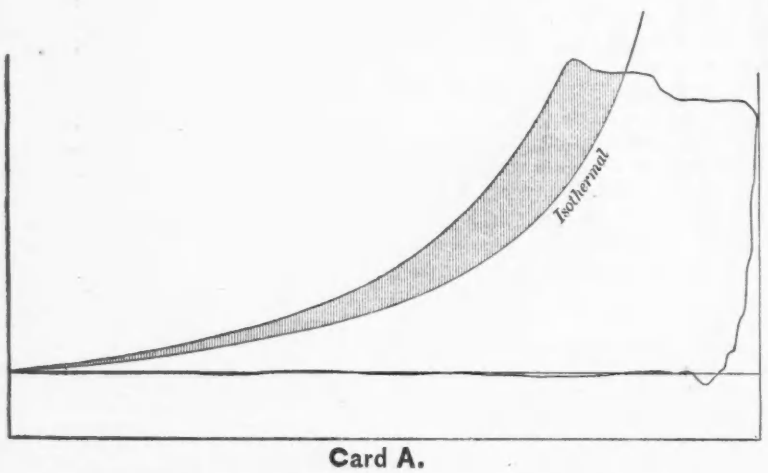
As to his challenge, we will consider it for the present as a "violent agitation" of the mind.

Now, Mr. Editor, seeing that this correspondence has been of sufficient interest to produce from the pen of Mr. K. J. Sundstrom, M.E., a rebuttal, as it were, of some of my former statements, I violate no secret by saying that, on the 29th day of October last, the superintendent and engineer of a mine where they use an Ingersoll compressor came to see if I could help them out of their difficulty. They said there was so much water in the air that it flooded their machines. On the 3d inst., I wrote the superintendent a note, to which he replied on the following day as follows: "Yours of yesterday received and noted. In reply, will say, we have derived great benefit from the second air-receiver put in when you were here last. In fact, we have not been troubled in the least with water since it was put in."

Now, the question arises in my mind, Where did the water come from? I am assured that this class of compressor makes dry air, and nothing but dry air; and I am positive that we did not have a good shower of rain during the month of October that could in any way get into the air-pipe.

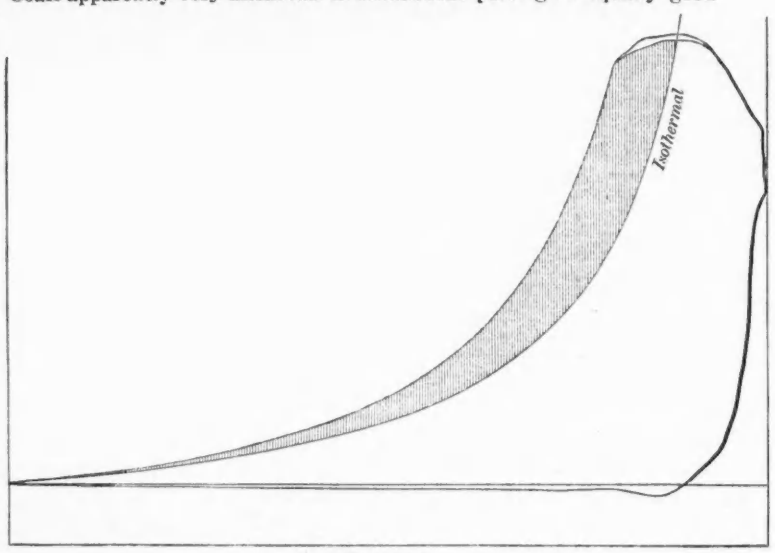
Thanking you, Mr. Editor, for valuable space and much courtesy extended through this long correspondence, I am yours respectfully,

ISHPEMING, Dec. 14. D. GILCHRIST.



Card A.

CARD A.—From Rand Class "A" air-compressor, with piston and piston-rod circulation shut off. Cylinder, 16½ inches diameter, 30-inch stroke. Revolutions per minute, 64. Air pressure by gauge, 61 pounds. Barometer, 28·26 inches. Temperature of engine-room, 72 degrees. Temperature of air in discharge-pipe, 302 degrees. Spring, 40. M. E. P. of actual card, 29 pounds; M. E. P. to isothermal curve, 23 pounds. Loss by increase of temperature, 20·69 per cent.



Card B.

CARD B.—From Ingersoll air-compressor, with spray injection. Cylinder, 20 inches diameter, 30-inch stroke. Revolutions per minute, 50. Barometer, 27·60 inches. Temperature of engine-room, 73 degrees. Temperature of air in discharge-pipe, 102 degrees. Spring, 40. M. E. P. of actual card, 33 pounds; M. E. P. to isothermal curve, 26 pounds. Loss by increase of temperature, 21·22 per cent.

THE MANUFACTURE AND COST OF COKE.

Written for the Engineering and Mining Journal by F. Koerner, M.E.

Analyses of coal give but very imperfect guides in the coking process. Coals apparently very dissimilar in constituent parts give equally good coke; and coals nearly identical vary much as to the resultant coke. It is, therefore, not surprising that the trials made with different retort or flue ovens should also give such contradictory results.

The factors, as far as the ovens are concerned, may be summed up as follows:

1. The hight of the column of the coal under distillation.
2. The width of the same.
3. Time.
4. The manner of burning the gases.
5. Atmospheric conditions.

1. The Appolt oven has given excellent results with the fat Saar coals, giving under a column of about 12 feet a uniform, strong, silvery coke; but when a modification of this system was tried in Silesia, by Dr. von Bauer, on but slightly leaner coals, it was found that the column had to be increased to 14 feet, and a different mode of charging and firing applied. Dr. von Bauer succeeded so well in the latter that he melted, or at least partly melted, the retort walls, at first, which had been made out of fire-clay that gave extremely satisfactory results in puddling-furnaces. I have a piece of such partly fused brick in my possession: it was obtained at Miroeshan in Silesia. After succeeding in the proper mode of firing his ovens, Dr. von Bauer made excellent furnace coke of uniform quality. It was claimed at Miroeshan that the ovens had worked up to calculated results—that is, without wasting carbon. Slight differences in construction and management produced widely different results. On the other hand, a column of coal only 9 feet high, in a Belgian oven, in Western Pennsylvania, seems to have given a coke far too dense for economical blast-furnace use.

2. At Terre-noire, in France, I obtained some figures, the results of a set of thorough experiments, showing how the width of the chambers or retorts of an oven, independent of the hight of the column, affected the quality of the coke. With a retort width of about 28 inches, the resistance to crushing of the coke was about 142 pounds; with a width of

20 inches, it rose to 200 pounds. The time of coking being the same in both cases, the narrower chamber produced the strongest coke with this coal, probably owing to the more thorough fusion.

3. The element of time also seems to vary with different coals in the same oven. The shortest time in which the Saar coals can be well coked in the Appolt was 26 hours when I observed them; the coals at Miroeshan, in a very similar oven, required only 15 hours. The Ruhr coals require 24 hours in the Coppée. In Wales, most coals require 48 hours in the same oven; and it is an interesting question whether a departure from the ordinary width of the Coppée oven would not shorten the time with the Welsh coals.

4. The manner of burning the gases is of great importance. Dr. von Bauer found a modification of the Appolt oven necessary, enabling him to mix the air for combustion much more thoroughly; hence, probably, he obtained greater heat and quicker fusion of the coal. From very extensive observations of the Coppée system, I have come to the conclusion that the failures of that system are to be traced to the imperfect mixing of gases and air in it. It would of course be comparatively easy to mix thoroughly more air with the gases on top of the vertical flues of these ovens; but the result might give too great a heat on the top and not enough on the bottom.

5. The varying influences of the atmosphere and direction of the wind are of vast importance in reference to uniform results in all retort ovens. Chimneys cure the evil only in a degree; and besides, the draught of chimneys being constant, within certain limits, they give but imperfect chance to vary the draught to suit the varying demands of the process. The need is, to bring this important factor within the control of the person in charge.

In view of these observed facts, how absurd it must appear, because *one* system of retort ovens, when used without extensive trials to obtain the proper width of retort and hight of the column of the coal, for any particular kind of coal, to say that all retort ovens are inferior to the venerable bee-hive!

Here, if anywhere, observation, trial, and good judgment are required, to modify and adapt the means to the end; and the end is worth any amount of trouble, the saving that can be effected being so enormous.

In the United States and England, no attempts, or next to none, have been made to suit any of these ovens to any special variety of coal. If any of these ovens, or their width and hight of coal column suited a coal, there was success; if not, they were pronounced inferior to the bee-hive.

A few cases, where the kind and size suited, have been published. One is that at the Dowlais Iron-Works, in Wales. The manager writes: "The coke is good and hard (from the Coppée oven); chemically and mechanically, there is no difference, as far as we are able to judge, on the blast-furnaces."

Messrs. Laughlin & Co., of Western Pennsylvania, use an improved François oven, giving excellent results with Connellsville coal. They say the yield is greater and the quality equal to bee-hive coke.

In these cases, the necessary conditions were fulfilled: the ovens happened to suit the coal.

In the Journal of the Iron and Steel Institute for 1878, so good an authority as Professor Jordan says: "The coke-makers of Durham, despite the unfavorable results (referred to by Lowthian Bell), will adopt the improved systems in use in France, Belgium, and Prussia. The failures reported by Mr. Bell had also been incurred by German manufacturers at first. The new ovens were introduced slowly, because the first trials were made with ovens, though of unquestionable merit, unsuitable for their coals." He ventured to say that was Mr. Bell's case!

Here we have the case in a nutshell.

NOTES ON ASSAYING LEAD BULLION.

Written for the Engineering and Mining Journal by Torrey & Eaton.

Discrepancies often arise between different assayers from three principal causes:

First. There is a want of uniformity in the various samples distributed for assay, or a want of proper mixture in the sample itself, so that different parts give varying results. We have found a difference of over 25 per cent in the gold value of portions taken from the top and the bottom of coppery lead bullion.

Second. There is some absorption of silver in the cupel.

Third. There is loss of gold in parting after cupellation.

In the best practice, two or three samples are taken from each pig (melted at a low temperature), and cast in a small bar, a portion of which is taken by each assayer, representing the buyer or seller. When properly done, these parts should not differ from each other; but they may both differ in their different parts, especially in the case of bullion containing copper or zinc. To secure agreement between assayers, each should take the same proportion of top and bottom from the sample for their respective assays.

We have just finished an umpire assay of coppery lead bullion where the top, containing the larger part of the copper, differed from the bottom, both in gold and silver. The brittle coppery portion showed 25 per cent less gold than the bottom or soft part of the bar.

Of course, the assayer should endeavor to keep the loss of silver down to the lowest possible point. If the cupels are properly dried, and heated fully fifteen minutes, the loss is then dependent entirely upon the condition of the muffle. If the muffle is too cold, the oxide of lead does not pass into the cupel, but remains melted just outside of the lead, and in this state absorbs the silver. When the muffle is too hot, silver is unduly absorbed by the cupel.* We have found the best way to secure a proper temperature is to work with a "proof;" that is, to find approximately the amount of silver contained in the sample, and then to make up the proof with this amount of silver, which is added to the same weight of lead as the weight of the sample taken, and cupel at the same time. By experience, the temperature that will give the least loss of silver in the cupel for any given amount of silver per ton can very readily be determined. The "proof" will lose silver, and this should be added to the assay in question, which also loses. This is called the "muffle correction." By this means, the absolute amount of silver in the sample can be ascertained. The effort of an assayer should be to reduce this loss to the minimum, as an assay adjusted by a high proof, although correct, will not do for a basis of settlement between owners and smelters, as this muffle correction is not generally allowed in the settlement.

If the sample is well taken and divided, there should be no variation in the gold found by different assayers. In the case of variation, the cause will be found in the variety of methods used after cupelling. If the acid is too strong, the gold will break up so finely that it will be lost in washing and annealing previously to weighing. Acid for parting, when the silver is largely in excess, should be 10 degrees Beaumé, and the vessel containing the gold should be allowed to stand for five minutes to settle before pouring off the acid in which the silver is dissolved.

This vessel, called a matrass, should then be filled with distilled water, and inverted in the annealing-cup, where it should rest for ten minutes at least, to allow all the suspended gold to settle. The cup should be carefully removed while under water from the matrass, so as not to disturb the gold, which, at this stage of the operation, being finely divided, is in danger of being lost. The gold is then annealed and weighed. We have described this part of the assay minutely, because it is here that we find a wide variation among assayers. One firm of high standing, known to us, subjects the gold to six washings, in order to insure the washing out from it of the last trace of silver. This is not necessary, and may cause a heavy loss of gold.

With a matrass holding 100 c.c., and pouring off the acid down to 1 c.c., filling up with distilled water, and pouring off to 1 c.c. again, we can part a button containing 100 milligrams and under, and will only have at the outside ·01 of a milligram of silver, which would only add 20 cents per ton to the gold, a less error than our most delicate scales will detect.

In a recent case submitted to us for assay, we found greater differences between top and bottom of the sample bar than between the buyer and seller of the bullion. The section of the bar was trapezoidal. The upper portion gave results of 2·55 ounces gold and 190 ounces silver. The center portion gave 3·55 ounces gold. The lower portion gave 3·28 ounces gold and 224 ounces silver to the ton. The highest assay was from the bottom of the bar. The top was coppery, and lost silver in the cupel; but the gold was more than proportionately low, showing clearly that in the case of coppery bullion, even with great care in sampling the invoice, the assay bar may be so divided, or so sampled for the assay, that largely varying results may be obtained.

In the above case, we obtained the following results: Ounces of gold per ton, 3·79, 3·50, 3·45, 3·35, 3·28, 2·55. Some of the above results were obtained before making assays of distinct portions, as top, middle, and bottom. The silver varied from 190 ounces to 224 ounces per ton, and the gold as given above.

To avoid errors caused by want of mixture of the bar itself, a section should be taken broader than the depth of the bar, and rolled out thin enough to cut into small fragments, so that an average of all the parts of the bar can be taken for each assay.

This method will be following the operation of the Mint Bureau in testing coin. In their practice, coins are rolled out, and as many as 150 disks cut out, which are mixed and averaged. This was found necessary, as variations of as much as from ·001 to ·002 were found from edge to center of coin. It would be advisable for large dealers in bullion to obtain such a rolling-machine, as the variations in assays spoken of often involve large values in base bullion transactions.

* Unless the assayer has sufficient cupelling to warrant the expense of a Reichhelm gas furnace and a Taylor automatic heat regulator, the most accurate results are not attainable. With those appliances, however, as detailed in the ENGINEERING AND MINING JOURNAL of August 28th, 1886, the muffle can be kept at any given temperature, the variation being confined within a limit of 25 degrees Fahr., and the error from varying heat reduced to the minimum.

The Suez Canal.—M. De Lesseps, acting as President of the Suez Canal Company, has just paid a sum of $400,000 to the Egyptian government for the purchase of additional land along the banks of the canal, required in view of the projected widening of the present waterway.

Hours of Labor in Germany.—In a recent report by Mr. G. Strachey, British chargé d'affaires at Dresden, some interesting data are given on the subject of the hours of labor in various parts of Germany. The statistics relating to the hours of labor that have lately been collected show that the greatest diversities prevail even within the limits of the same place and class of occupation. The average length of the German working day (intervals of rest deducted) is eleven, or, at most, twelve hours. But a day of ten hours or less is very common. The industrial employments connected with stone, earth, and the necessaries and luxuries of life entail exceptionally severe and prolonged labor. The same may be said of certain textile branches, especially spinning, and of iron-founding, in which, however, long periods of rest are usual. Persons in charge of machinery and boilers are liable to unbroken attendance of from twelve to thirteen hours, in some cases of twenty-four hours, although they have a high degree of responsibility. The length of the working day is subject to great variations from place to place. It is a maximum in East and West Prussia; in Pomerania, it averages eleven hours; in Posen, from ten to eleven; in Hanover and Schleswig-Holstein, eleven; in Dresden and Bautzen, eleven; Zwickau and Meissen, from eleven to twelve; Leipzig, from ten to twelve; Hamburg, from ten to eleven; Bremen, ten. In the Silesian district of Oppeln, there is a twelve-hour day in blast-furnaces, lead, silver, and coke-works, flour-mills, dyeing-works, and printing-offices. In the mining industry, the rule is continuous day and night work in twelve-hour relays, two hours of rest included. For part of Bavaria, it is reported that, in the larger part of the industrial concerns (employing 30,000 hands), the daily time exceeds eleven hours, and in 200 concerns (with about 5000 hands) the period is over twelve hours. In 600 concerns (employing 18,000 hands), it is under eleven hours. On the whole, if extra work is deducted, the labor in the manufacturing industries is lighter than that usual in handicraft and trade, but is more closely tied down by rules.

THE LAW OF THE APEX.*

By R. W. Raymond, New York City.

Appendix.

Since the foregoing paper was printed, I have received the decision of Judge William E. Church, of the First District Court of Dakota, in the case of *Michael Duggan et al.* vs. *John H. and Frank J. Davey* (Silver Terra-Sitting Bull case), published in full in the *Black Hills Weekly Pioneer* of August 9th, 1884. The journal mentioned gives also several interlocutory decisions rendered in earlier stages of the case; but I shall quote here only so much of the final decision as bears upon the construction of the Revised Statutes concerning the apex, the end-lines, and the extra-lateral mining right, together with a sufficient statement of the facts of the case to explain the scope of the decision.

"This is an action in equity, brought in the first instance to restrain a threatened trespass by the defendants upon certain mining property in the possession of the plaintiffs, known as the 'Silver Terra' claim; the allegation being that the defendants were about to enter, through underground workings, the ground of the plaintiffs, and remove therefrom valuable bodies of silver ore.

"The answer of the defendants, admitting the acts constituting the alleged threatened trespass, further averred that they had, in fact, at the time complained of, reached and passed, in their underground workings, through and beyond the vertical side-line of the Silver Terra claim, and thereupon justified the acts complained of, and claimed the right to pursue their workings into and through the Silver Terra ground, by virtue of their alleged proprietorship of a vein, lode, or ledge of rock in place, bearing silver, having its top or apex within the lines of a certain other mining claim called the 'Sitting Bull,' of which they claim to be the owners, which vein, lode, or ledge extended in a continuous body of mineral-bearing rock from such top or apex to the ground in controversy, and constituted the body of ore in dispute; and that it was in the pursuit of this vein, lode, or ledge in its downward course that they had passed beyond the vertical side-lines of the Sitting Bull claim, and for some hundreds of feet beyond into the ground in controversy.

"Subsequently, a supplemental complaint was filed, setting up the entry into plaintiffs' ground by the defendants, and their claim of right to do so, and asking further relief by a decree restraining the assertion of such claim, and quieting the title of plaintiffs.

"The case was tried before the court without a jury. . . .

"Custer Hill, upon which these claims are located, is situated in the village of Galena, in Bare Butte Mining District, in this county. The village lies at the base of the western slope of the hill, which presents a lateral face from south to north (taken along the line of the outcrop hereafter mentioned) of 1300 or 1400 feet—of course, at the base it is somewhat wider. At its northern extremity, it turns to the east; and its northern slope presents a lateral face, from west to east, of upward of 3000 feet at least. Along its base, and following it in this turn, in the direction indicated, is a small stream called Bare Butte Creek. These slopes are quite steep, and extend from base to summit, about 1200 to 1300 feet. The whole country is hilly and broken; and this hill is only one of a series of similar elevations, with which it is more or less directly connected. Northwardly, across Bear Butte valley or gulch, which is there perhaps 500 feet or more in width, is another hill, known in this case as the Florence Hill, whose southern slope extends laterally, from west to east, nearly parallel with Custer Hill.

"Beginning now at or near the southern extremity of the western slope of Custer Hill, at a point perhaps half-way or more up the slope, there is found an outcropping layer or stratum of a reddish quartzite or metamorphic sandstone, several feet in thickness (upward of 10 feet, at least), overlain by a body or stratum of limestone or dolomitic shale, of a thickness not definitely ascertained, but certainly extending several feet above the quartzite. . . . This is the farthest point northwardly [southwardly? R. W. R.] or westwardly to which attention has been given in the case.

"From this point, the croppings may be readily traced, in several places, by high, reef-like ledges, jutting out boldly from the face of the hill, along the western face of [to? R. W. R.] its northern extremity. The general bearing of this line of cropping in the direction indicated is given by Mr. Dickerman, one of the defendants' witnesses, as N. 11 degrees W., the distance as 1243 feet, and the angle of inclination upward, from south to north, as 3 degrees 26 minutes. Mr. White, a witness for plaintiffs, gives the distance as 1300 feet, and the angle of inclination as somewhat less than that stated. At the northern extremity of the hill, this line of outcrop of quartzite with overlying limestone or dolomite turns and extends along the northern slope with a downward inclination, thus gradually nearing the base of the hill, until, at a distance of something over 2500 feet (not established by the testimony), it disappears beneath the bed of the creek. . . .

"Along the whole line of this outcrop as thus described, locations of mining claims appear to have been made, which I note here, as they have been referred to in the testimony, mainly for convenience of description and reference.

"First on the south is the War Eagle location, north of that the Savage, then, on the same face of the hill, the Custer. I believe another location, called the Highland Chief, embraces some part of this line, but have no certain reference to it. On the northern slope are, first, the Neptune, then the Sitting Bull, and then the McClellan—all located in an easterly and westerly direction, end to end, along this line of outcrop already described extending across the northerly face of the hill.

"More specifically with reference to the Sitting Bull, that location is situated about midway—east and west—of the northerly face of the hill, and extends from the point of discovery, about 690 feet in a direction S. 74° 30′ W. (reversely N. 74° 30′ E.), and from the same point about the same distance N. 89° 30′ E. The end-lines are parallel, having a bearing of S. 35° E. The claim is thus about 1380 feet long, and is about 300 feet in width. Throughout this length, the line of outcrop described is wholly within the side-lines of the location, and passes through the end-lines very nearly at their middle points.

"Adjoining the Sitting Bull on the south, and passing up the hill in the order named, are the Tiger Tail, Surplus, Fraction, and Silver Terra locations, all laid substantially parallel with the Sitting Bull. The Tiger Tail is owned or claimed by the defendants; the others, by the plaintiffs, or some of them. Adjoining the Tiger Tail and Surplus on the west, and the Sitting Bull on the north, is another claim of the plaintiffs called the Richmond. For the Silver Terra and Sitting Bull claims, the plaintiffs and defendants respectively hold patents of the United States.

"As already stated, the ledge within the Sitting Bull location has been exposed by numerous excavations, and drifts have been run in various directions in the quartzite, from all of which more or less valuable silver ore has from time to time been extracted.

". . . I must, therefore, find this body of quartzite to be a vein, lode, or ledge of rock in place, bearing silver, within the meaning of the statute.

"Secondly. Is the top or apex of this vein or lode within the lines of the Sitting Bull location?

"The definition of the top or apex of a vein, usually given, is 'the end or edge of a vein nearest the surface.' And to this definition the defendants insist we must adhere with absolute, literal, and exclusive strictness, so that whenever, under any circumstances, an edge of a vein can be found at any surface, regardless of all other circumstances, that is to be considered as the top or apex of the vein. The extent to which this view was carried by the defendants, and I must confess, its logical results, were exhibited by Professor Dickerman, their engineer, who, replying to an inquiry as to what would be the apex of a vein cropping out at an angle of one degree from the vertical, on a perpendicular hillside, and cropping out also at a right angle with that along the level summit of the hill, stated that, in his opinion, the whole line of that outcrop, from the bottom clear over the hill as far as it extended, would be the apex of the vein.

"Some other witnesses had a similar opinion.

"The definition given is, no doubt, correct under most circumstances, but, like many other definitions, is found to lack fullness and accuracy in special cases; and I do not think important questions of law are to be determined by a slavish adherence to this letter of an arbitrary definition. It is, indeed, difficult to see how any serious question could have arisen as to the practical meaning of the terms top or apex, but it seems, in fact, to have become somewhat clouded. I apprehend that if any intelligent person were asked to point out the top or apex of a house, a spire, a tree, or a hill, he would have no difficulty in doing so, and I do not see why the same common-sense should not be applied to a vein or lode. Statutory words are to receive their ordinary interpretation, except where shown to have a special meaning; and as I think the testimony shows that these terms were unknown to miners in their application to veins, before the statute, the ordinary rule would seem to apply to them.

"Justice Goddard, a jurist of experience in mining law, in his charge to the jury in the case of the *Iron Silver* vs the *Louisville*, defines top or apex as the highest or terminal point of a vein 'where it approaches nearest the surface of the earth, and where it is broken on its edges so as to appear to be the beginning or end of the vein.'

"Chief-Justice Beatty, of Nevada, who is mentioned in the report of the Public Lands Commission of 1879–80, as 'one of the ablest jurists who has administered the mining laws,' in his letter to that commission says, after defining dip and course or strike: 'The top or apex of any part of a vein is found by following the line of its dip up to the highest point at which vein-matter exists in the fissure. According to this definition, the top or apex of a vein is the highest part of a vein along its entire course. If the vein is supposed to be divided into sections by vertical planes, at right angles to strike, the top or apex of each section is the highest part of the vein between the planes that bound that section; but if the dividing planes are not vertical, or not at right angles to a vein which departs at all from a perpendicular in its downward course, then the highest part of the vein between such planes will not be the top nor apex of the section which they include.' (Report of Public Lands Commission, page 399.)

"I am aware that in several adjudged cases, top or apex and outcrop have been treated as synonymous, but never, so far as I am aware, with reference to a case presenting the same features as the present.

"The word apex ordinarily designates a point, and, so considered, the apex of a vein is the summit, the highest point in the vein in the ascent along the line of its dip or downward course, and beyond which the vein extends no farther; so that it is the end, or, reversely, the beginning of the vein.

"The word top, while including apex, may also include a succession of points, that is, a line; so that by the top of a vein would be meant the line connecting a succession of such highest points or apices, thus forming an edge.

"I have spoken of 'the dip or downward course' of the vein, treating these words as synonymous, and so I think they must be regarded. Dip and depth are of the same origin—dip is the direction or inclination toward the depth; and it is 'throughout their depths' that veins may be followed, and this is surely their downward course.

"Mr. Riotte gives us a different definition. He says: 'Starting any line upon the apex of the vein, and running down upon the vein parallel to the end lines' (of the location), 'the inclination that line has is the downward course of the vein.' And when asked, 'So that the direction of the end-lines of a mining location absolutely fixes the direction of the downward course of the vein?' he replies, 'As far as it interests the man who has located that claim.'

"Elsewhere he says that, in his view of the law, end-lines of locations are, as he expresses it, 'swingable,' so that when the locator determines the direction of his ore-chutes, he may swing his end-lines parallel to them so as to take them in throughout their depth.

"A very little reflection will show that, if this be the law, a locator, instead of being limited to fifteen hundred feet along the vein, could readily place his end-lines at such an angle as practically to control nearly three thousand feet of the vein.

"With all proper respect for this gentleman's opinion, I can not accept

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*A paper read before the American Institute of Mining Engineers. The paper to which this was an appendix was published in the ENGINEERING AND MINING JOURNAL, Vol. XXXVIII., 1884.

We publish this important though not new paper in answer to many requests received from different parts of the country.—ED. E. AND M. J.

his views upon this subject at all. I think it clear that the law intended these lines to be laid substantially at right angles to the general course or strike of the vein—since in no other way could the locator be limited to a given length along the ledge.

"This seems to have been the view taken of the law by the three learned judges who sat in the Richmond-Eureka case. It is true that they there hold that the provisions of the law of 1872. requiring parallel end-lines, may be regarded as merely directory, so that a failure to so lay them would not invalidate the location; but I think the whole force of the observations of the court upon this point lies in their assumption that it makes no difference how the miner may choose to locate his end-lines, since the law limits his right to that section of the lode or ledge carved out by vertical planes, drawn through the extreme points or ends of his line of location, at right angles with a line representing the general course or strike of the lode. (See pp. 360–363 of Copp's U. S. M L., second edition.)

"In this same case, on appeal to the Supreme Court of the United States (13 Otto, p. 844), the fact is noted that the 'zone,' as it is called, dips at right angles to its course or strike, and that the extension downward of the compromise line, which was coincident with the end-lines of the adjacent claims, followed the dip of the zone.

"I have been led into some digression from the strict line of my argument.

"Bearing in mind the descriptions heretofore given of the two lines of outcrop on Custer Hill, if we might suppose that the outcrop along the northerly face were nearly vertical, I do not see how it could be seriously contended that such outcrop, under the circumstances, constituted the top or apex of this stratum of quartzite. Such a conclusion could only be reached, as it seems to me, by shutting one's eyes to every feature of the case, except the one fact that there was an edge at or near the surface, which was, therefore, the top or apex of the vein.

Flagstaff, which was laid across these lines, that the location of the Titus was a good one, using the language above quoted. There, moreover, the dip of the vein was northeastward, and no such question arose as that involved in this case.

"In view of the principles already laid down, I think that the longitudinal course of this zone of quartzite is indicated by the croppings on the west face of the hill, and not by those on the northerly slope.

"After what has been said, it would seem unnecessary to consider whether this vein so far departs from a perpendicular in its course downward as to extend outside the vertically extended side-lines of defendants' location, and through the intervening ground to the ground in controversy—such could not be the case, consistently with the facts already ascertained.

"It may be conceded, as, indeed, a mathematical conclusion from the facts, that by extending drifts from the Sitting Bull location throughout its vertically extended south side-line, in any direction upon the vein east of south, a downward inclination would be found; and that such is the fact with regard to the main working tunnel, which extends to the ground in controversy; but clearly this is not what the statute contemplates; and if I am right in my other conclusions, probably this proposition would not be contested. . . .

"The decree must be that the plaintiffs are entitled to the relief demanded.

"This disposes of the case for the present; but I feel bound to express my acknowledgment of the courtesy of counsel throughout the whole of this long and weary trial, both to me and to their adversaries. The importance of the interests involved, and the fact that this is the first case of the kind which I have been called upon to try, have led me to give many hours of my best thought and study to the determination of its questions, as I endeavored to give patient attention to its hearing. I am not conscious of having evaded any of its responsibilities, but have

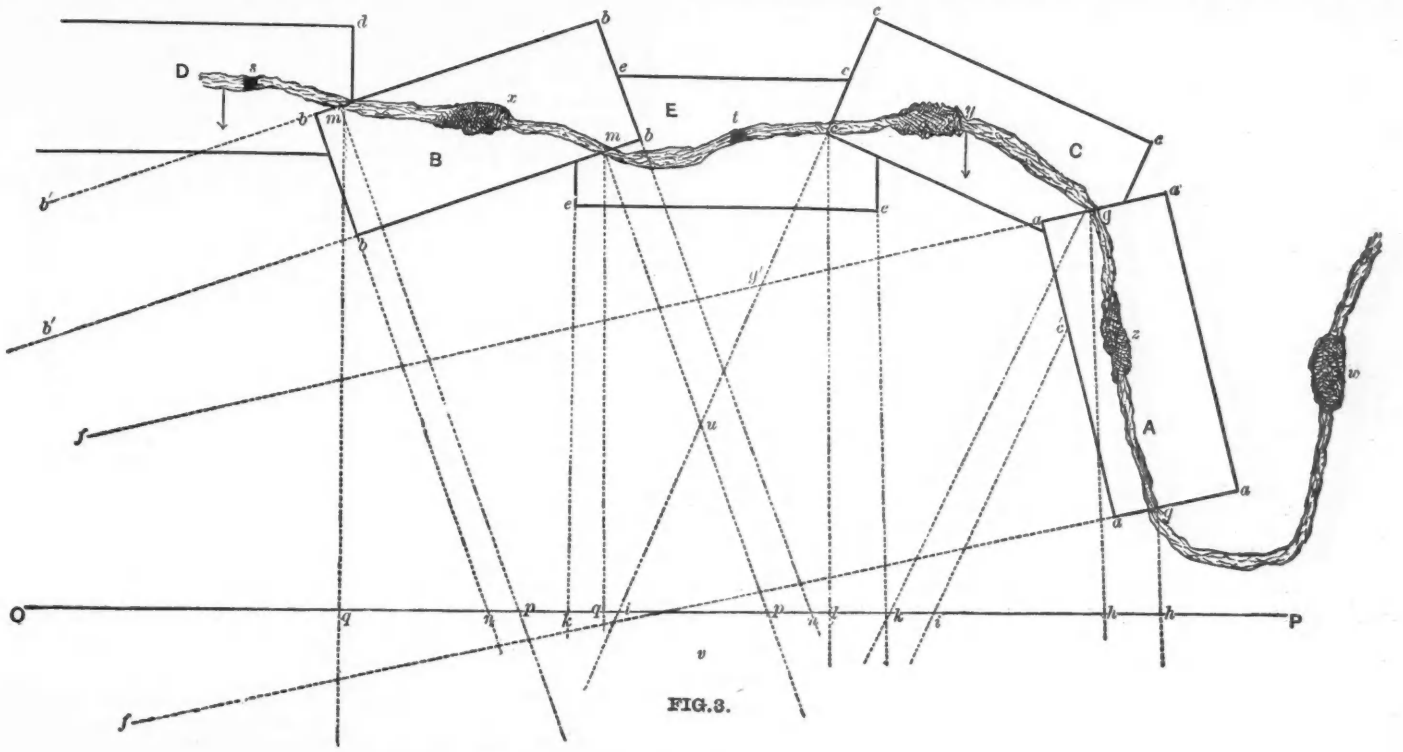


FIG. 3.

"This I can not do without such a violation of the ordinary use of words and, with all the respect and deference which I feel for the oginions of the learned counsel for the defense, I must say, without such a transgression of the dictates of a sound common-sense view of the situation as, in my judgment, the statute does not contemplate. Nor can I see that there would be any difference whatever in principle were this outcrop to be found at an angle of 45 degrees, or, as it is, at an angle of about 8 degrees from the horizontal. I am compelled, therefore, to hold that this outcrop, found in the Sitting Bull location, is not the top or apex of this vein, lode, or ledge, and that such top or apex is not within that location. I must regard that outcrop as merely an exposure of the edge of the vein on the line of its dip.

"But thirdly. If this is not the top or apex of the vein, then neither is it its longitudinal course.

"That by the use of the term 'along the vein,' the statute requires a location to be made along its longitudinal course or strike, I shall not stop to argue. Such again was the opinion of the court in the Eureka-Richmond case.

"But by the term 'strike,' in this connection, I do not mean the technical true strike of the engineer, the line which would be cut by a horizontal plane. Such a requirement would be in many cases impracticable.

"The Supreme Court of the United States has said in the Flagstaff case (*Mining Company* vs. *Tarbet*, 8 Otto, 463), that 'the most practicable rule is to regard the course of the vein as that which is indicated by surface outcrop or surface explorations and workings'—and I have no disposition, as I should not be at liberty, to disregard the doctrine of that case, so far as it is applicable to the circumstances.

"In that case, a line of outcrop ran up a hill nearly in a westerly direction. A level line, run somewhere beneath the surface, showed the strike to be north 50 degrees west. The line of the Titus location was not far from midway between these two; and the court held, as against the endeavored to so state the facts and my conclusions thereon, as to present the case in the best practicable form for the review which I hope may be made.

"I am fully aware of the importance of this determination to the defendants. This case affords another exemplification of the unfortunate results attendant upon the purpose of the government to dispose of ore-bodies as things distinct from the soil. The present laws are a hot-bed of litigation, and fruitful source of error.

"I could wish that this case had fallen into abler and more experienced hands than mine, but the duty has fallen upon me, and I have discharged it to the best of my ability."

If Judge Church had had long experience in mining cases, it is quite likely that he would have decided this question differently; but in that case, he might really have contributed less to its final solution. The matter is surrounded with doubt; and it is no small advantage to the mining industry that it should be presented for the ultimate decision of the Supreme Court in a clear, thorough, and conscientious opinion like the foregoing, although that opinion seems to contravene the general present usage of miners, the letter of the Supreme Court decision in the Flagstaff case, and the letter of the statute.

This case may be better understood by reference to Fig. 3 in the foregoing paper, which is here reproduced for convenience. Assuming the right-hand side of the figure to be north, and the lower line *e e* of the claim *E* to represent the ridge of Custer Hill, we have the outcrop *s x t y* running along the western slope, turning at *g*, extending along the northern slope through *z*, crossing the gulch and appearing again at *w* in Florence Hill. Of course, the directions and proportions are not exactly those of the actual case, since the figure is a purely imaginary one. But it was drawn to exhibit just such *conditions* as those described by the court. The plaintiffs in the case do not claim that their lines embrace the outcrop. They are situated as would be the owner of a location of which the point *u* is the center, but in which the outcrop *t* is not included. A

least, they do not plead the possession of any apex, but rest on their rights, as surface-owners, to all minerals beneath their surface, except such as may be included in lodes of which other locators possess the "top or apex." The court holds very properly, that the burden of proof is upon any one who pretends to the right to enter the plaintiffs' ground. The mere exhibition of the patent or location record, and proof of the surface-lines, make a complete case for the plaintiffs, unless the defendants can affirmatively prove that, in entering the plaintiffs' ground, they are following on its downward course a lode of which the apex is within their own ground.

The defendants occupy the position of the locator A in the figure. For the purposes of this decision, we may assume that they have the prior title. (There was conflicting testimony on this point; but the court passed it by, as not affecting the result under the final ruling.) They have, beyond dispute, the outcrop *g z g*; and they claim the right to follow the vein indefinitely between the lines *aaf*, *aaf*, and hence into, and through, the location including *u*

The court decides that *g z g* is an undoubted outcrop, but not the top or apex; that *g g* is not the longitudinal course of the vein; that *af* is not the direction of its downward course; and, by implication, that the extra-lateral rights of the defendants are bounded by *gh*, *gh*. This is the case in a nutshell.

In my paper, I have stated both sides of the question with sufficient clearness, and do not propose to reopen its discussion here The weak point in Judge Church's decision seems to be a certain indefiniteness. He says he does not mean by the longitudinal course or strike, "the technical true strike;" and he does not mean the course as shown on the surface. The truth is, that, unless one or the other of these directions is adopted, there can be no guide at all to the locator. I infer that the court thinks the true strike should be sought, and that a rough approximation to it would be acceptable, and would not be deemed open to later corrections. The vagueness of this rule is evident. Moreover, the difficulty of making a location under the rule would be very great. It must be remembered that the Land-Office holds the locator to his lines as once surveyed and fixed, and will allow no change of them which affects the rights of other parties. Now, under the ruling just quoted, how could A in Fig. 3 make a valid location, being, as we have assumed, the first-comer on the hill, and having discovered only the exposed outcrop? According to mining customs and the intention of the law (to say nothing of its letter), this first discoverer of a valuable mineral vein should have the right to a full claim upon it. The fact that he has discovered it in a steep place, instead of a level place, ought not to prevent him from acquiring and enjoying that right. Nor should the law say to him: "Well done, enterprising prospector; you have found a lode hitherto unknown. Now work it underground, or discover it again in other places, and trace it until you know its true course, at least approximately; and *then* you may make a location on it, the end-lines of which, being drawn across the true, or nearly true, course, shall be your boundaries." He ought not to be bound to know, or to find out before location, the course of the vein outside of the claim he proposes to lay upon it; and while it is true that (except in the rare case of a perfectly vertical vein) the surface-outcrop, not being level, can not show the true course, yet that negative fact helps him little.

But we will suppose that A, Fig. 3, makes his location after having discovered the outcrops at *x* and *y*, and after having divined (for he could not well have proved at this early stage of operation) that *x*, *y*, and *z* are all outcrops of one lode, and that its course is in the general direction *xy*. Nevertheless, for some reason, say because the ore exposed at *z* is richer than elsewhere, he desires to include that part of the lode in his claim. Under this ruling, he might put one end-line at lower *g*, with the direction *gh*. But where could he put the other? If he should draw it through the point *c* on the vein, with the direction *cl*, then he would have on the true course of the vein the length *lh* (the *h* nearest *P*); but his claim on the surface following the outcrop would be nearly or quite twice as long; and the chances that the Land-Office would admit such a location, or public sentiment would tolerate it, would be very small. The Revised Statutes, it will be remembered (section 2320), declare that a mining claim "may equal, but shall not exceed, 1500 feet in length along the vein or lode," but also, that it "shall be governed as to length along the vein or lode by the customs, regulations, and laws in force at the date of their location." Now, I think there is no doubt that the customs of miners, now as heretofore, have limited the length of the claim by the surface-measurement, so that, if 1000 or 1500 feet were the customary length, no pretext would be permitted to justify a claim longer than that by surface-measurement. The consequent difficulty of A, in the case supposed, might be further described, but is, I trust, plain enough.

Another point in the decision seems to require comment. The court criticises the statement of Mr. Riotte, one of the expert witnesses, who has said that, in his view of the law, end-lines of locations are "swingable," so that when the locator determines the direction of his ore-chutes he may swing his end-lines parallel to them so as to take them in throughout their depth. If this be a correct representation of Mr. Riotte's view, that view is undoubtedly erroneous. A locator can not swing or move his lines after once fixing them, if the existing rights of others would be affected by the change. But the proposition that he may originally locate them (or change them by re-survey, if the existing rights of others are not affected thereby) so that they will include the supposed downward course of the ore-chutes, is a different one, and not so certainly erroneous. Whether right or not, it is and has been a common practice.

Again, this decision seems to ignore the peculiar form of the grant of the extra-lateral right in the Revised Statutes. This I have already pointed out in my paper. The law first gives to the locator, broadly and sweepingly, all the lodes of which his claim includes the top or apex, and it is after this comprehensive grant that the limiting proviso occurs, restricting such ownership of the outside parts of such lodes to the portions included between the extended end-lines. The language is not easily capable of any construction that does not make one pair of end-lines the boundaries for the extra-lateral right on *all* lodes the top or apex of which is within the claim. It does not explicitly require that these end-lines should cross the true course of the lode at right angles. And the attempt to make it mean this involves a difficulty which may be best stated by a supposition. Suppose the location contains the apexes of two lodes, one crossing the end-lines at right angles, and the other crossing the same end-lines with maximum obliquity. What, under this decision, are the boundaries of the extra-lateral right on the latter?

Let us now consider more closely the manner in which this decision deals with the utterance of the Supreme Court in the Flagstaff case. On page 30 of my paper, the words of the Supreme Court are quoted. It there appears that "*the principal difficulty in the case* arises from the fact that the surface is not level, but rises up a mountain," so that the strike of the vein, which is really northwest, is made to appear on the surface as west, the dip being northeasterly. And in another quotation, on page 48, the court distinctly says, "As the law stands, we think that the right to follow the dip of the vein is bounded by the end-lines of the claim properly so-called; *which lines are those which are crosswise of the general course of the vein on the surface.*" On page 30, the court goes on to say that perhaps the law is imperfect in this regard; "perhaps the true course of a vein should correspond with its strike, or the line of a level run through it; but this can rarely be ascertained until considerable work has been done, and after claims and locations have become fixed. The most practical rule is, to regard the course of the vein as that which is indicated by surface outcrop, or surface exploration and workings. It is on this line that claims will naturally be laid, *whatever be the character of the surface, whether level or inclined.*"

Judge Church quotes part of this passage, disclaims any intention of disregarding it, and declares that the Flagstaff case did not involve the question now before him. It is true that the Flagstaff decision settled chiefly the point that the side-lines, if they cross the vein on the surface, become the end-lines, and limit the extra-lateral right; but in coming at this point, we have the word of the Supreme Court that the difference between surface course and true course constituted *the principal difficulty in the case.* This difference amounted to about 45 degrees; in the case before the Dakota court, the corresponding difference appears to have been nearly 90 degrees. The difference between these differences does not seem to involve any principle. And the declarations of the court, above quoted, seem to me to cover the Sitting Bull case. For the court says in the same decision (see page 48 of my paper) that, in its opinion, "the right to follow the dip outside of the side-lines is based on the hypothesis that the direction of these lines corresponds substantially with the course of the lode or vein at its apex on or near the surface;" and this, taken in connection with the declaration that the course on the surface may not be the true course, and the fact that, in the case at bar, it was not the true course within some 45 degrees, constitutes a strong statement, which Judge Church's brief treatment does not fully meet.

His decision coincides in part with that suggested on page 52 of my paper. But the objections there raised to it, which appeared to me insurmountable, have not been removed by this more recent construction of the law. If the Supreme Court will take Judge Church's view, well and good. We shall know where we stand, at least; but there will be a great unsettling of titles. For against this ruling United States patents afford no protection. Its full logical consequences would require the rectification of innumerable underground boundaries, heretofore determined by end-lines which do not cross at right-angles the true courses of lodes. In many instances, the ownership of valuable *bonanzas* would be changed by such a rectification. To return for illustration to Fig. 3, if the true end-boundaries of the extra-lateral right of A are *gh*, *gh*, then the boundary of C's rights (at the left end of his claim) must be *cl* instead of *ci*; and if the triangle *lci* contains a *bonanza*, E will get it, instead of C, though C was on the ground first, and laid out his location before E had been heard of.

It would be going too far, however, to assert that this principle could not be practically applied. Aside from the difficulty of dealing with existing rights, it appears to be practicable that the mineral surveyor should be required, in laying out the surface-lines of a location, to see that the end-lines cross at approximately right angles the horizontal course of the lode; *provided*, that his determination and location of such lines be final, and not subject to later rectification. If the horizontal course of the lode throughout the location is not straight, then the necessary parallelism of the end-lines must be secured by assuming an average course, or by drawing a horizontal line through the two ends of the claim on the lode, and assuming that to be its course. Or other claims on the vein, if such exist, or other exposures of it, if such can be traced, might be taken into account; and the general course of the lode, as far as it is known, might be adopted, irrespective of local variations, as the line across which the end-boundaries must be laid at right angles. The side-lines, however, must run parallel with the lode at the surface; and the discoverer of an outcrop on a hillside would generally be put at disadvantage, because he could not get a surface-claim conforming to the law which would give him its full length on the horizontal course of the lode. Considering the circumstance that the larger number of outcrops discovered are not level, but inclined, and are first found on hillsides, where denudation has usually brought them within reach of human discovery, this objection is a serious one. The system could be enforced; but it would not be popular, and its success would be doubtful. Perhaps it would diminish litigation over mining rights; but to take rights away, in order that people may not fight about them, is a remedy not calculated to console the litigants.

The matter is again summed up in the sentences of Judge Church's decision, in which I heartily concur: "This case affords another exemplification of the unfortunate results attendant upon the purpose of the government to dispose of ore-bodies as things distinct from the soil. The present laws are a hot-bed of litigation, and fruitful source of error." He might have added, that this "purpose" of the government has its origin and continuance in the desire of the mining communities themselves. If they would favor a change, it could easily be secured.

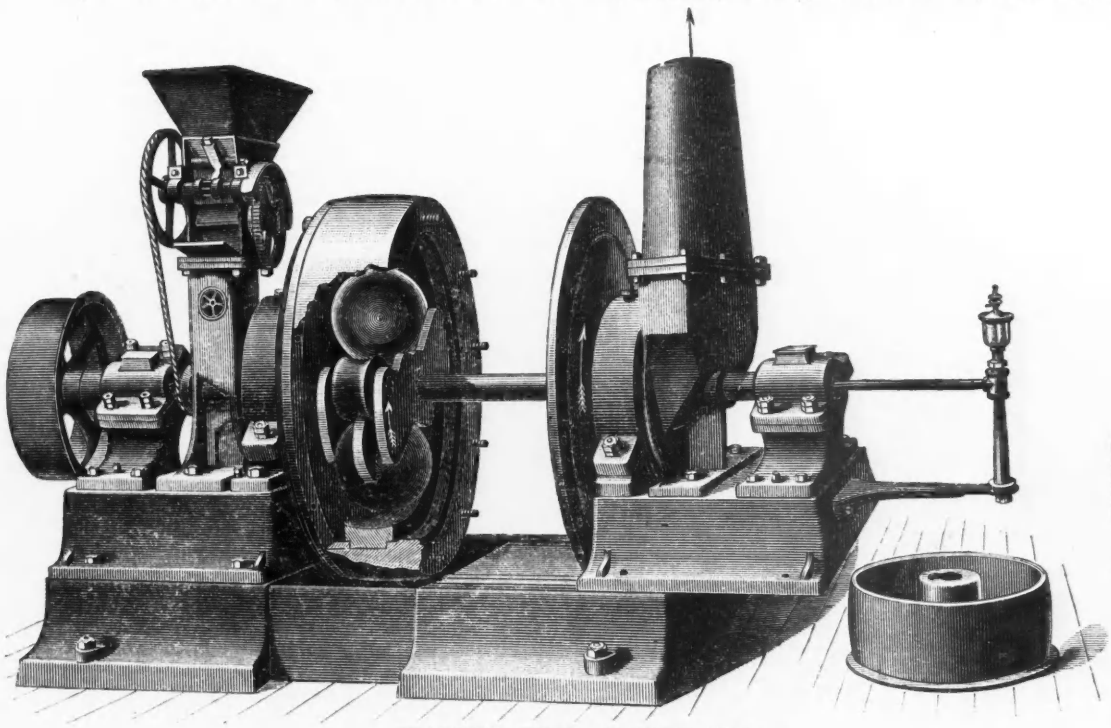
Electricity in Bleaching.—A French inventor proposes to use electricity for bleaching paper pulp in the following manner: A solution of chloride of magnesium is used. This is of the strength of about 16 degrees Beaumé. On passing a current through, electrolysis taking place, various chemical reactions occur, setting free divers oxychlorides, which, so it is said, effectually bleach the fiber.

THE WARING DRY PULVERATOR.

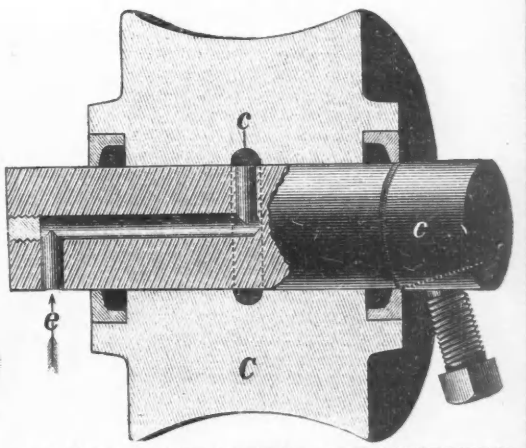
We illustrate herewith the dry pulverator, for the pulverization of ores, etc., manufactured by J. B. Waring & Co., whose address will be found in our advertising columns. In the illustration, the mill is shown opened, the discharge side being moved away from the chamber on a V-shaped guide-track, until the end of the shaft is but a little way in the outside bearing. The curved projection, shown directly under the center of the pushing-rollers, performs no function while the machine is in operation, its use being only to prevent the balls from falling out of place when the mill is stopped and centrifugal force ceases to act. At the right, in the illustration, is shown a patent lubricator, by which the delivery of oil can be accurately regulated. This lubricator is supported upon a standard attached to the pedestal, and moves with it when the mill is opened or closed The oil flows through the small tube that enters the hollow shaft far enough, when the machine is closed, to deliver the oil to radial passage-ways in the carrier to the pins of the loosely journaled pushing-rollers. By this arrangement, the amount of oil can be so regulated as to feed just enough to relieve the friction on the pins.

Fig. 2 is a sectional view of the pin and loosely journaled pushing-roller. The oil, flowing in regulated quantity, as described, through the radial passage-ways of the carrier, enters the stationary pin through the drilled hole (*e*), and thence flows to the annular space (*c*), in the rotating roller *C*. Any excess of oil is absorbed by the felt packing shown at the ends.

The operation of the machine is as follows: The ore is delivered by the automatic feed through the hollow journals of the chamber, which



WARING DRY PULVERATOR.



WARING LUBRICATING ARRANGEMENT.

is rotating at about fifty revolutions a minute. The centrifugal motion there imparted to the material causes it to fly from the center and evenly line the crushing surface. The center shaft and carrier that holds the loosely journaled pushing-rollers is caused to rotate in the same direction, as indicated by arrows, but about 300 revolutions a minute faster than the center. An exhaust-fan induces a current of air through the mill, entering at the damper shown directly under automatic feed, and discharging in the receivers through the discharge-pipe at the right. There is no grinding or attrition action. It is the principle of the Chilian mill; but centrifugal force is used to give to small rollers the same weight as the ponderous rollers of the Chilian mill.

Further information and prices upon application to Messrs. J. B. Waring & Sons.

Electrolytic Precipitation of Metals—T. Moore, *Chemical News*: When solutions containing either iron, cobalt, nickel, zinc, cadmium, aluminium, chromium, or manganese are treated with phosphoric acid and ammonium carbonate, and are electrolyzed, the first five are completely precipitated, chromium forms a soluble chromate, manganese is partially deposited as oxide on the other electrode, while the aluminium is unaltered. For separate determinations of the first five, the following plan answers well: The slightly acid solution of ferric or other sulphate or chloride is treated with a solution containing 15 per cent of glacial phosphoric acid until the yellow color disappears, ammonium carbonate is added in large excess, and the whole warmed gently until the solution is clear. On electrolyzing the hot solution—70 degrees—with a current equal to 1200 or 1300 c.c. mixed gases per hour, the iron or other metal is deposited rapidly and completely. A current equal to from 100 to 300 c.c. of mixed gases per hour is sufficient to effect the deposition of the zinc, while a current of 40 c.c., which gives no deposit with zinc, is strong enough for cadmium. A good solution for the electric deposition of either zinc or cadmium is prepared by precipitating the solution of a zinc or cadmium salt with sodium phosphate, dissolving the precipitate in potassium cyanide, and adding excess of ammonium carbonate. This solution, when electrolyzed at 80 degrees with a current equal to 1000 c.c. of mixed gases per hour, gives a rapid and complete deposit.

THE EFFECT OF DISSOCIATION ON STEEL MELTING-FURNACE ECONOMY.*

By Edward Crowe.

According to Deville, water begins to decompose at 1000 degrees Cent. into oxygen and hydrogen; as the temperature is raised above this, a greater proportion of the quantity of water heated is decomposed, until a temperature is reached at which the whole volume is decomposed; on the temperature being lowered, combustion or combination begins to take place, and is continued until the temperature falls to 1000 degrees Cent. again, when the whole would be recombined and form water.

Carbonic acid is decomposed in the same manner, but at a much lower temperature, forming carbonic oxide and oxygen. Dissociation, therefore, places a limit upon the temperature it is possible to obtain by combustion, as, when a sufficient quantity of gases out of a given volume have been burnt to raise the whole to the temperature of dissociation, it is impossible for the remaining uncombined gases to burn until their temperature becomes lowered, and the greater the proportion of burnt gases, the lower the temperature becomes at which the remainder can burn.

Combustible mixtures, when ignited in closed vessels, attain only about one half of their theoretical temperature on explosion, and only about one half is burnt; the remainder burns slowly as the temperature decreases; this is clearly demonstrated by Mr. Dugald Clerk's experiments on explosions of gaseous mixtures in closed vessels.

It is held by many that the cold walls of the vessels prevent complete combustion; but, as Mr. Clerk remarks, explosions give the same results in small as in large vessels; therefore the cooling effect of the cylinder walls can not have much influence on combustion.

The fact that explosive mixtures containing different proportions of combustible gases attain the same percentage of their maximum theoretical temperature on explosion, seems to prove that dissociation can not be the only cause of incomplete combustion, as when gases dissociate more at higher temperatures; then in weaker mixtures, a greater percentage of total possible heat should be developed than in stronger ones; but as the temperature necessary for dissociation increases with the percentage of total gases dissociated, it follows that a mixture having only a small proportion of its volume composed of combustible gases will require a correspondingly lower temperature to bring a given proportion of the contained explosive gases to their dissociating point; also, these experiments on dissociation are based on explosions in closed vessels; therefore the stronger the mixture, the higher the pressure, and it is well known what an influence pressure has on the inflammability of explosive mixtures. Pressure may also make combination possible at higher temperatures.

Supposing the flame of a steel-melting furnace to greatly exceed the temperature at which dissociation of carbonic acid begins, it is interesting to consider the effect of dissociation on the working and economy of such furnaces.

Regeneration will affect the temperature by raising the temperature of the gases before ignition; consequently a smaller quantity of gases will be required to burn and raise the temperature to dissociating point. The dissociating temperature will therefore be very high, as a very small percentage of the gases has combined.

When a furnace is cold, the gas burns with a short flame, which becomes longer and longer as the furnace becomes hot; it is generally supposed that the shortness of flame indicates imperfect combustion, or the cooling effect of the cold furnace walls, so to speak, kills the flame; but when the furnace is almost as hot as the flame, it reaches probably right across the furnace, and travels down the ports into the regenerators; then the flame is said to be properly developed. Supposing, however, dissociation to exist, we should take a very different view of the matter; the flame entering a cool furnace would have its heat rapidly extracted, which permits its rapid combustion, and,

* London *Engineering*.

supposing the furnace to be above the temperature of ignition, would rather aid combustion than otherwise. When a flame burns in a furnace almost as hot as itself, a minimum amount of heat is extracted from it, and the temperature of the gases on leaving the regenerators, but before combustion, being probably far above dissociating temperature, would require a minimum amount of combustion to maintain at dissociating temperature. A furnace may be so hot that the flame still burns when it is half-way down the regenerators; it is by no means an extraordinary occurrence to find the silica checker-work in the chambers fused.

Great trouble is often experienced in working short furnaces, on account of the melting down of the regenerators, due to the fact that sufficient heat is not extracted from the gases to allow complete combustion to take place in the furnace itself; and I have known steel melters remark that a certain furnace was a bad one, because the passages or ports from the furnace to the regenerators are so short that you can not get sufficient heat without melting down the chambers; in a sense, they are quite right; the beginning of the flame is the hottest; and if it is thought necessary to use a higher temperature than the tail end of the flame is capable of giving, it is certainly preferable to dissipate its heat in long and well-ventilated ports than that the regenerators should be destroyed.

It is obvious that dissociation places a limit to the temperature of a furnace, and that it is easy to waste fuel to the destruction of the chambers without gaining one degree of heat in the furnace itself.

METALLIC ORES OF THE COUNTRY BETWEEN THE GREAT LAKES AND HUDSON'S BAY.

Written for the Engineering and Mining Journal by Dr. Robert Bell, Assistant Director Geological Survey of Canada.

The mineral capabilities of the region extending between the great lakes and Hudson's Bay are quite extensive.

To begin with iron: it has been discovered in considerable quantities near the north shore of Lake Huron. It has been found in several places not far from Algoma Mills, and again at Desert Lake, north of the Bruce mines. A deposit of iron was reported on an island in Lake Nipissing by Mr. Murray, of the Geological Survey, nearly thirty years ago. Still farther north, toward James's Bay, is the largest iron deposit yet known in that whole country, and situated at the foot of the Grand Rapid of the Mattagami River. It was first pointed out by me in 1875. Proceeding toward Lake Superior, very large quantities of iron ore are found, not far north of Batchawana Bay. I also found indications of large deposits of iron near the Montreal and Perch rivers. A deposit of hematite was discovered by one of my assistants on the Slate islands, in 1870, and some low-grade magnetite has long been known to occur at the mouth of the Little Pic River. To the north of this region, a perfect mountain of iron has been discovered by that fortunate prospector, Mr. Peter McKeller, of Fort William. It is back in the woods, in the unsurveyed region, about 200 miles northeast of Port Arthur. In my reports of 1869 and 1870, I mentioned certain discoveries of iron near Long Lake, on the south side of Lake Nipigon, on the Sturgeon River, some of which have since been found to be important. A comparatively valuable deposit of magnetite, in workable quantities, occurs near Silver Lake, not far from the head of Thunder Bay. Quite lately, a rich deposit of magnetite has been found on the celebrated 3 A silver location, Thunder Bay. Still farther west, during the past summer, two important discoveries have been made, one of them on the Atik-Okan (Reindeer Antler), just north of the south bend of the Seine River, about 100 miles northwest of Thunder Bay, and thirty miles south of the Canadian Pacific Railroad track. The ore is of first-rate quality, and described as occurring in immense quantities, and it is probable that it will be extensively worked before long.

The other large deposit occurs about 100 miles farther west, and is also south of the Canadian Pacific Railroad, at a considerable distance to the eastward of the Lake of the Woods. There is a rich deposit of hematite on Big Island in Lake Winnipeg. Between Lake Winnipeg and York Factory, on Hudson's Bay, at the narrows of Knee Lake, there is a large quantity of magnetite. I discovered one deposit of rich magnetite, in the region I was exploring this summer, but am unable to give particulars until I have made my official report.

Copper is known to exist in more or less promising quantities at numerous places on the north shore of Lake Huron. One of these is the Wallace mine, near Killarney, which was worked at one time for both copper and nickel. Then passing westward, the celebrated Bruce mines are situated about 40 miles east of Sault Ste. Marie. Work was begun here in 1846 and continued until 1876. In the palmiest days of its enterprise, large numbers of Cornish miners were employed, and quite a town was built In 1876, the mines closed, and it being the year of the Philadelphia Exhibition, I collected statistics that showed the output during the thirty years to have amounted to $3,300,000. Copper ore has been found in notable quantities at several points inland from the Bruce mines and around Echo Lake.

I have not yet examined the Sudbury mines personally, but at the time ore was discovered there, some three or four years ago, I had samples of all the different kinds sent to me. The first ore prepared for market amounted to about 3000 tons, which, however, was of a lower grade than the producers supposed, and I was informed that, on the advice of one of their New York correspondents, they cobbed it over and reduced the 3000 tons to 1000, which was found to contain about 7 per cent of metal. In my explorations in the extensive region between Lake Huron and Hudson's Bay, I have found many indications of copper, which have been reported from time to time. Among the earliest copper mining enterprises in Canada, were those of the Quebec and the British American mining companies. The works of the former were carried on at Namanise (Little Sturgeon), in the Lake Superior region. In later years, the Lake Superior Native Copper Company carried on operations in the same neighborhood. Recently, this company has been reorganized as the Lake Superior Copper Company, but little is done at present. On Michipicoten Island, in the northeast angle of Lake Superior, a company, called the Michipicoten Native Copper Company, was organized a few years ago. After working a short time, this company was also reorganized, and last winter had a small force of men at work. At both the above localities, copper occurs in the native state. About forty years ago, numerous locations were taken up, principally in the names of gentlemen residing in Montreal, but which were held by the Montreal Mining Company. These were afterward sold to what was called the Silver Islet Mining Company, but more correctly the Ontario Mineral Lands Company. One of the locations thus taken up was the celebrated Wood's location, in which Silver Islet is situated. Some locations were worked near Nipigon Bay and southwest of Thunder Bay. I have found indications of copper in many places northwest of Lake Superior.

The principal deposits of lead in the district under consideration are at the Victoria mine, near Garden River, a short distance east of Sault Ste. Marie. This mine was principally owned in Quebec City. A short distance to the north of that, another lead mine, the Cascade, has also been worked to some extent. On the northwest side of Black Bay, Lake Superior, a rich vein of lead was worked by the Enterprise Mining Company. Other large deposits of this ore are known to exist in the same neighborhood, but, owing to the very low price of lead at the present time, there is not much inducement to open them. Around Thunder Bay also, a number of lead-bearing veins have been discovered. Lead occurs in several localities on the Lake of the Woods.

Silver is also well represented. It was first found many years ago on Lake Superior, notably on Michipicoten Island, and Prince's Location, not far from Port Arthur. But the first discovery of silver to attract public attention in late years was that afterward known as the Thunder Bay mine, situated about three miles northeast of Port Arthur. Here, native silver was found in large quantities, in quartz at the outcrop of the vein. The mine promised to be so rich that immediate steps were taken to prevent its being plundered, owing to the silver being so easily obtainable on the surface. Attempts were made to open the mine: but from various causes, prominent among which was bad management, it never made a success, and has been closed for some years. A short distance southwest of Thunder Bay, another mine was discovered and worked under the name of the Shuniah mine, afterward changed to the Duncan mine. The celebrated Silver Islet mine was discovered in 1868, while Wood's Location was being surveyed by Mr. Thomas Macfarlane, now chief analyst in the Inland Revenue Department here. One of the first blasts at the surface of the vein threw out silver ore to the amount of $1500. The mine was worked to the depth of 1200 feet, and $2,500,000 worth of silver is said to have been produced. The silver mines at present attracting attention are situated inland or in two groups at twenty-five and thirty-five miles southwest of Port Arthur, in the White Fish River region. The mines in which most work has been done are the Rabbit Mountain, Beaver, Porcupine, and East and West End Silver Mountain. The three first mentioned are actively worked, and quite lately, the East End Silver Mountain was sold to a joint-stock company in Liverpool for $150,000 cash, and the company has undertaken to spend a still larger sum on the property.

Traces of gold have been found in various places north of Lake Huron. On Lake Superior, a vein containing visible nuggets occurs in Jackfish Bay. On Partridge Lake, nearly one hundred miles to the northwest of Port Arthur, small nuggets are disseminated through a large mass of quartz, and some distance west of this locality another rich gold-bearing vein has been discovered. The Huronian mine, owned by an Ottawa company, is situated near the hight of land about one hundred miles west of Port Arthur. Here, a well-marked vein has been worked to some extent. A crushing-mill has been erected, but the principal impediment in the way of the working of this mine is the want of transportation facilities. A good road to the mine has become absolutely necessary. Gold has also been discovered in numerous localities on the Lake of the Woods, but at present little or nothing is done.

The European Steel Rail Combination.—*Kuhlow's* says: There is again talk of an international rail convention. It is stated that on the 12th proximo a meeting of rail manufacturers will be held, either in London or Düsseldorf, for the purpose of considering the advisability of going back to the old arrangement, and, in iron and steel trade circles, there is a feeling that the movement has good prospect of success. We are glad to report that the rail trade is at last coming to its senses, not because the step that is about to be taken agrees exactly with what we predicted would occur when the old convention was dissolved, but because there is a chance of the present ruinous rivalry being brought to an end.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED DECEMBER 14TH, 1886.

354,091. Pumping-Engine. William A. P. Bicknell, New York City. Assignor to William A. Perry and Charles C. Worthington, both of same place.
354,102. Machine for Butt-Welding Tubes. John Crea, Alleghany, Pa.
354,104. Ore-Washer. John L. Deam, Columbia, Colo.
354,110. Rolling-Mill. Samuel Duff, Steubenville, Ohio.
354,126. Composition of Matter for the Manufacture of Axle-Bearings. George F. Godley, Philadelphia, Pa.
354,158. Asbestos Sheet. Robert H. Martin, Brooklyn, New York.
354,182. Process of Treating and Desilvering Copper Matte. John J. Crooke and Robert Crooke, New York City.
354,185. Apparatus for Manufacturing Illuminating and Heating Gas. Francis B. Forster, New York City.
354,200. Stone-Dressing Machine. Frank Manning, Ardmore, Pa.
354,202. Process of Cutting V-Shaped Slots in Sheet Metal. Charles T. Mason, Jr., Sumter, S. C., Assignor to the Mason Cotton Harvester Company.
354,203. Ore-Sampling Machine. Walter McDermott, Brick Church, New Jersey.
354,284. Guide for Molds for Compound Ingots. Elbridge Wheeler, Boston, Mass., Assignor to himself, Ware B. Gay, and George W. Gogin, Trustees, all of same place.
354,209. Apparatus for Extracting Oils. Christian Baumgarten, Schulenburg, Texas.
354,331. Miner's Pick. James M. Mathews, Pocahontas, Va.
354,345. Composition for Neutralizing Fumes of Explosives. Thomas Price, San Francisco, Cal.
354,380 Grate for Burning Natural Gas. Edward Bourne, Alleghany, Pa.
354,393. Process of Obtaining Sulphur from Sulphureted Hydrogen. Carl F. Claus, London, England.
354,412. Making Perforated Screening-Plates. Stephen H. Harrington, Chicago, Ill.
354,487. Automatic Hydraulic Compressor of Air or other Gases. Harry C. Roif, Cincinnati, Ohio, Assignor, by direct and mesne assignments, to the Acme Manufacturing Stock Company, same place.

PERSONALS.

K. Yamada, representing the Imperial Mining Bureau of Japan, is visiting mines in this country in the interest of his government, for the purpose of seeing the American methods of treatment of the different minerals.

Thomas B. Provis, M.E., from London, is at present on his way from New York to the Zaruma mines, in Ecuador, South America, of which he is the consulting engineer. The object of Mr. Provis's visit is to arrange for the establishment of additional milling facilities, the machinery for which will be built in this country.

The New York *Tribune* is to be congratulated on recalling to its staff Mr. Z. L. White, the ablest and most discriminating writer upon industrial, and especially upon mining, subjects of the entire New York secular press. We welcome Mr. White back to metropolitan journalism.

FURNACE, MILL, AND FACTORY.

The Norton Iron-Works, Ashland, Ky., is receiving bids on a two three-ton converter Bessemer steel plant.

The furnace at Minersville, Pa., to be called the Marion, is fast assuming shape to go in blast.

D. Eagan and associates, iron operators, will establish an extensive Bessemer steel-works at Sharon, Pa. Work will begin at once.

A charter has been granted to the Pennsylvania Iron-Works, of Philadelphia, Pa., with a capital of $150,000. The directors are Martin Maloney and W. Elkins, Jr., of Philadelphia, and B. W. Geist, of Reading.

Messrs. Seaman, Sleeth & Black, of the Phœnix Roll Works, Pittsburg, Pa., have added a new department to their works, which will be fitted up with powerful cranes and other equipments. The works will have facilities for making rolls that will weigh twenty-eight tons.

The Clayton Air-Compressor Works, of this city, have just issued an attractive illustrated catalogue (No. 5) for 1887. It contains illustrations and descriptions of the Clayton improved air-compressors, rock-drills, and other mining machinery manufactured by this well-known establishment.

The Benwood blast-furnace at Martin's Ferry, Ohio, is now at work on common iron to be used in the Benwood mill to make muck-bar to be sold to Pittsburg mills. The Belmont, Riverside, and Benwood are making muck iron for sale in the Pittsburg market. These mills have been making steel rails during the past two years, thus doing away with the puddling departments.

Six tons of molten steel exploded at Carnegie's steel-works, Homestead, Pa., on the 22d inst., seriously injuring four employés. The ladle containing the molten metal was swinging from the smelting-furnace to the ingot-mold, when the crane broke and the ladle dropped. The metal poured into the pit below, and the explosion followed, scattering hot fragments over the mill. All the workmen escaped but the four mentioned.

The Sturtevant Mill Company, of Boston, is receiving very flattering testimonials from parties using the Sturtevant mill, crusher, and pulverizer combined. Among those who have recently adopted these mills may be mentioned the Etewan Phosphate Company, Charleston, S. C.; the Penn Salt Manufacturing Company, Philadelphia, Pa.; and the Pacific Guano Company, Wood's Holl, Mass., all of which give complete satisfaction.

The control in the United States for the construction of the Lash patent steel-melting furnaces has been secured by Messrs. Lean & Blair, engineers and contractors. A number of these furnaces are now in successful operation in Pittsburg, Park, Brother & Co., Limited, of the Black Diamond Steel Company, having four, with a capacity of 30 tons each per heat. Carnegie, Phipps & Co. have a similar number in operation at their Homestead Steel-Works, and Anderson, Dupuy & Co. have one with a capacity of 15 tons per heat at their Pittsburg Steel-Works. The Linden Steel Company, Limited, is erecting one that will have a capacity of 20 tons per heat when completed.

The Western Nail Association of the Atlantic States Nail Association has agreed to call a general convention of the nail manufacturers of the United States, to be held in Philadelphia or New York early in January, the date and place to be fixed by the secretaries of the two associations. The purpose of the meeting is to consider a plan for the curtailment of production and the fixing of a scale of prices. The plan for the curtailment of the production will probably take the form of a stoppage of the works for two or three months each year. It is stated that the capacity of the nail mills has for several years been greatly in excess of the demand, so that profits have been at a minimum. There are said to be now about 2700 machines in the West and between 1000 and 1200 in the East.

BIDS ON CONTRACTS.

BRIDGE.—The Commissioner, Chicago, Ill., has received the following bids for constructing a swing-bridge over the Chicago River at State street: The King Iron Bridge and Manufacturing Company, Cleveland, Ohio, $26,774; and the Keystone Bridge Company, Pittsburg, $30,699; A. Gotlieb & Co., Chicago, $24,440, to whom the contract was awarded. Also for furnishing and placing in position the machinery for operating the said new State street bridge, the contract is awarded to the Vulcan Iron-Works, of Chicago, at $2942, other bidders being John Featherstone, Chicago, $3600, and the Excelsior Iron-Works, Chicago, $3929.

LABOR AND WAGES.

Beginning the 22d inst., all the collieries in the Schuylkill region operated by the Philadelphia & Reading Coal and Iron Company will go upon three-quarter time.

A United or Labor Convention will be held at Cincinnati, Ohio, February 22d, and every industrial element or association is invited to be represented at the convention

A circular has been issued by coal miners at Osceola and at Phillipsburg, Pa., asking that on and after January 1st an advance of 10 cents be granted them for mining. They ask that with this exception the Tyrone scale remain as before.

Leading coal operators at Youngstown, Ohio, and a committee of miners representing all mines in the Mahoning Valley, have signed an agreement to submit the advance asked for by the miners to a committee of arbitration, numbering three, which is to report before January 1st, 1887, and the decision of two of the three members is to be binding on both. The miners returned to work on the 20th inst., and if granted the advance, it is to begin from that date. The miners have selected John McBride, of Massillon, to represent them, and the operators appointed Robert McCurdy, of Youngstown. A committee of miners met Robert McCurdy, on the 21st inst., and signed an agreement to adopt the Columbus sliding-scale. The agreement will be presented to a convention of operators and miners, to be held at Youngstown, on the 24th inst. It is believed it will be accepted and the sliding-scale adopted.

The demands made by the coke workers of the Connellsville region, Pa., have assumed an entirely new phase, which will bear an important part in the final settlement of the matter. It is claimed that the Knights of Labor have not indorsed the letter sent to the coke syndicate asking for an advance, and that they have not decided to unite with the Amalgamated Association and declare a strike. From this standpoint, the matter is said to be practically in the same shape as when the original demands were presented by the Amalgamated Association. At a meeting of the coke syndicate, held at Pittsburg on the 20th inst., the demands of the workmen were refused. A conference was to be held in Pittsburg on the 23d inst. between the coke workers and the coal operators. It is the general opinion of labor leaders that a settlement will be reached, as neither side wishes to push a fight.

COAL TRADE NOTES.

IOWA.

Coal was struck at Waterloo, at a depth of forty feet, while boring for a well. Shafts are sinking and further investigations making. Coal has also been struck at Reinbeck.

KENTUCKY.

A movement is on foot looking to the consolidation of all the coal mining interests in the Western Kentucky District. This includes the fields of the St. Bernard, Hecla, Empire, Clifton, Central Coal and Iron Company, Memphis, Mud River, and Dovey. All these coals are used at Chattanooga more or less extensively, except the Dovey. The plans for the consolidation are yet immature. These various companies own over 50,000 acres of coal land.

PENNSYLVANIA.

BITUMINOUS.

It is stated that Theodore Woods, of McKeesport, is offering $50 an acre for the option of coal land between Suterville, on the Youghiogheny, and Sunny Side, on the Monongahela River, a block comprising several thousand acres. Mr. Woods is acting for an Eastern syndicate, which proposes to mine coal both along the Pittsburg, McKeesport & Youghiogheny Railroad and the Monongahela River.

GAS AND OIL NOTES.

Exports of refined, crude, and naphtha from the following ports, from January 1st to December 18th:

	1886. Gallons.	1885. Gallons.
From Boston	5,390,292	8,359,260
Philadelphia	14[illegible],882,134	148,086,693
Baltimore	15,251,272	10,924,994
Perth Amboy	6,084,050	
New York	380,222,573	359,549,214
Total exports	552,828,321	526,920,161

The Kentucky & Cincinnati Natural Gas Fuel Company, which owns 16,000 acres of land and has leased 20,000 more in Martin County, Kentucky, and Logan County, Virginia, has on the properties two wells, one in each county, that are said to produce altogether 15,000,000 cubic feet of natural gas a day. It is now getting machinery on the properties with which it expects to sink 15 additional wells. To do this, it will have to bore from 1330 to 1340 feet in each case. While sinking these wells, the company is preparing to lay a 16-inch pipe from the wells now in action that will convey the gas through Louisa, Catlettsburg, and Ashland, then crossing the river to Ironton, Ohio, and continuing on to Cincinnati. The flow of natural gas from these wells has continued for more than a century, says a correspondent of the Baltimore *Manufacturers' Record*. It was first noticed publicly by George Washington, who, when a young man, made many surveys through this section. Reference is made to them in his reports, which are still to be seen in his handwriting. He called them "burning springs." When there was trouble with the Indians, while Governor Dinwiddie ruled the colony, a bargain was made with a Captain Savage that he should raise a command of a hundred men and with them fight the Indians a hundred days. For doing this, he was to receive a grant of 100,000 acres of land. The captain fulfilled his part of the contract, and Governor Dinwiddie sent Washington to survey the land, which was afterward deeded to Savage, who paid off his men with portions of it, but retained the larger part as his share. This land has ever since been known as the Savage or the military grant. This occurred about the middle of the seventeenth century. The company's capital stock is $20,000,000, of which 10 per cent has been paid in cash, in compliance with Kentucky law. At present, Mr. W. C. Shires is the general manager, and Mr. Isaac Rigdon, superintendent.

COLORADO.

Two new stills for enlarging the refinery at Florence, Fremont County, have arrived.

The Arkansas Valley Oil Company, at Florence, has completed a switch to its refinery, and is making many improvements and sinking more wells.

INDIANA.

A powerful vein of natural gas was struck on the 17th inst. by the drillers of the Kokomo Gas and Oil Company, Kokomo. A crowd of two dozen stockholders in the well had gathered about it when a spark from the engine ignited the gas and the flames spread among the spectators, badly burning all of them about the face and hands, and fears of fatal results in some cases are entertained.

MISSOURI.

St. Louis people, who some time ago formed a company to make investigations at Litchfield, Belleville, and other places in Illinois, as well as in Missouri, have decided that Edwardsville is the most suitable spot whence to supply natural gas to St. Louis, and as it is only seventeen miles from the city, piping will be comparatively cheap. The St. Louis company succeeded in buying out the local company, known as the Gaertner Oil Mining and Gas Company, which was formed by local parties four years ago, by paying partly in cash and the rest in stock, securing leases on about 4000 acres of land. It has added some 2000 acres

to this, and is preparing to bore. The first well will be sunk on the farm of Mr. Frederick Gaertner, three miles north of town, within a few feet of where a very strong well was struck over twenty-five years ago. This well is still emitting gas, but it is useless, owing to the explosion caused by the ignition of the gas. This cracked the casing and allowed the well to fill with water. It is proposed to bore 2000 feet, at which depth the Trenton limestone will be reached.

PENNSYLVANIA.

The Philadelphia Gas Company has withdrawn the casing from its well on the Sloan farm, near Blairsville, after the well was down about 2000 feet, and it will be plugged up and abandoned. The company intends to sink another well near Bolivar, about eight miles from Blairsville, and will test the field thoroughly before abandoning it.

The Cleveland & Pittsburg Natural Gas Company is making preparations to lay a gas line from some of the wells in the northwestern part of this State to Cleveland.

WEST VIRGINIA.

The suits brought by J. M. Guffey & Co. against the Wheeling Natural Gas Company, in the United States Courts in Pittsburg, Pa., and Wheeling, to compel the company to retain the leases of 400,000 acres of gas and oil territory in West Virginia, have been compromised on condition that the defendant company retain 6000 acres of the territory near Fairview, on which three wells have been drilled almost to completion. The final disposition of the matter will be made by the Wheeling company at its meeting of stockholders next week, when the question of raising the capital stock from $500,000 to $1,000,000 will be considered.

GENERAL MINING NEWS.

ALABAMA.

A decision has just been rendered by the Supreme Court of Alabama in a case that involves the title to several million dollars' worth of lands originally given to the Alabama & Chattanooga Railroad Company by Congress. The suit was brought by Jefferson County, in the Chancery Court, to compel the trustees to make a legal title to forty acres of land in sight of Birmingham, worth $50,000. The Supreme Court decides on appeal that all sales made before the completion of the road are void, except 120 sections of land on the first twenty miles near Chattanooga, unless they were made in strict conformity with the act of Congress of 1856. As none of the sales made before the completion of the road did conform to the act, all are void. All sales made since the completion in 1871 are good. As the road runs through the richest mineral districts of Alabama from Chattanooga to Meridian, the void sales amount to millions of dollars, the lands having within the past few years increased enormously in value.

ALASKA.

ALASKA UNION MINING COMPANY.—This company has concluded a contract with the Union Iron-Works, of San Francisco, for a 160-stamp mill, to be erected at its mines, Douglas Island. It is expected to have the mill in full operation next May. This company owns two claims 600 by 3000 feet. The ore is a free-milling ore, with a large percentage of free gold.

ARIZONA.

GRAHAM COUNTY.

OLIVE.—Messrs. Frank Allison, S. B. Corley, and James K. Brown are the owners of this mine. The two former have sold their undivided interests to Mr. Thomas L. Rodgers, of Boston, Mass., on the basis of $15,000 for the whole mine. The Olive has yielded, according to the smelter returns to date, $32,400. The shaft is only 114 feet deep, from which point drifts have been made on the ledge.

PIMA COUNTY.

Edwin B. Palmer has brought suit in Chicago, Ill., against Joseph W. Haskins, to recover $240,000 worth of shares in the Atlas Mining Company, which he claims the defendant improperly obtained from him. In his bill, the plaintiff alleges that he entered into an agreement with Haskins to furnish him with $60,000 to work four copper mines of great value, which he owned at Red Rock, Pima County, on condition that Haskins would give him a half-interest in the concern. This was represented by nearly $500,000 in shares; but the defendant, it is charged, turned over but $150,000 worth, dividing up the remainder with other parties with whom he had been carrying on negotiations without the plaintiff's knowledge. An injunction restraining Haskins from assigning or disposing of the property was issued by Judge Seeley.

ARKANSAS.

The recent discovery of silver mines on Tomaha Creek, in Searcy County, has created much excitement in Northern Arkansas, as well as in the entire State. Large parties are out in all directions prospecting.

CANADA.

PROVINCE OF ONTARIO.

Mr. T. P. Pierce, of Marmora, Ont., has purchased the property of the Cobourg, Peterboro', and Marmora Railroad and Mining Company, and will apply to Parliament for an act authorizing him to build a road and to operate the mines.

PROVINCE OF QUEBEC.

BUCKINGHAM MANUFACTURING COMPANY.—This company has completed the sale of its land at the Leaure Basin to a syndicate of Boston capitalists. The property consists of 200 acres, and possesses unrivaled water-power. The purchasers propose to put up the necessary machinery for grinding and crushing iron ore.

COLORADO.

ARAPAHOE COUNTY.

Much interest is taken in the Denver Mining and Ore Exchange of the Chamber of Commerce and Board of Trade. It is the intention to list the stocks of productive mines. At a recent meeting, the following officers were elected: President, James Matthews; First Vice-President, James Hudson; Second Vice-President, H. A. W. Tabor; Treasurer, W. R. Bush; Assistant Secretary, Thomas S. Wiswall. The following gentlemen are among the members: Edward Eddy, C. H. Morris, G. E. Randolph, C. L. Webb, James B. Grant, N. P. Hill, P. McCourt, H. N. Nichols, W. H. James, Dennis Sullivan, Joseph Standley, Herman Strauss.

CLEAR CREEK COUNTY.

FREELAND.—Official advices to us state the production for November to have been: Gold, $15,786.39; silver, $3552.07; copper, $33; total, $19,371.48.

MANSFIELD MINING AND MILLING COMPANY.—This company of Mansfield, Ohio, whose properties are situated at Dumont, has made a transfer of all its right, title, and interest to George A. Clugston *et al.*, trustees. A syndicate has been formed to work the properties.

NEATH GOLD.—This company has been organized in St. Louis, with a capital stock of $1,000,000, shares $10 each, to work the Neath mines. The directors are James C. Moore, A. F. Shapleigh, Charles Speck, J. W. Donaldson, John M. Dumont, and John Scudder. James C. Moore was elected President; Judge Charles Speck, Vice-President; J. W. Donaldson, Secretary; H. B. Miltenberger, Treasurer; and J. M. Dumont, Superintendent.

PLUTUS.—We have been officially advised that the production for November amounted to: Gold, $3566.13; silver, $2853.86; copper, $168.25; total, $6588.24

WOODBURN MINING AND SMELTING COMPANY.—This company, which is erecting the smelter at the mouth of Chicago Creek, has leased and bonded the Dove's Nest lode, on Seaton Mountain, and started work. Sinking will soon begin, when a plant of machinery will be erected.

DOLORES COUNTY.

Mr. Linwood O. Towne, of Rico, sends us the following:

GRAND VIEW MINING AND SMELTING COMPANY.—While the furnaces of the smelter are shut down till spring, large quantities of ore are laying in, not only from Rico, but from Trout Lake and Ophir mines. A continuance of the present good weather will probably bring ores from the latter places all winter. The mines of the company are steadily worked, the Phœnix and the Grand View being the present producers.

NEWMAN GROUP.—The new lessees on this group, Messrs. Learned & Hackett, have opened on the Swansea what is said to be as fine a showing as has ever been made. Shipments of high-grade ore are regularly made to the Grand View Smelter.

PASADENA REDUCTION COMPANY.—The smelting plant of this company has been sold to John R. Griffiths, of St. Louis. Mr. W. W. Parshall is reappointed local agent in Rico. None of the immediate plans of the new owner has been made public.

GUNNISON COUNTY.

CINNAMON MOUNTAIN.—This company, to which we referred extensively in our issues of July 10th and August 7 and 14th, is doing its necessary assessment work. The Crested Butte *Elk Mountain Pilot* says: From the amount of stock the company is supposed to be selling in London, it certainly ought to do more development than a mere hundred dollar assessment.

LAKE COUNTY.

From the Leadville *Herald-Democrat*, we condense the following:

ADAMS.—The company has closed a contract with the La Plata Smelting Company for 3000 tons of ore. The rates obtained are considered favorable for the mine.

BREECE.—Another contract has just been closed with the Colorado Coal and Iron Company for 5000 tons more ore, to be used in the manufacture of steel rails at the Pueblo Works, for the new Midland Railroad.

CHRYSOLITE.—The shallow shaft on this property, known as the Bucket, is penetrating a mass of iron ore.

HASSELL MILLING COMPANY.—A concentrating mil has been erected by this company in St. Kevin Gulch, near the St. Kevin mine, for the concentration of the low-grade ores. The mill is well equipped for the dressing of such ore as is produced by this mine.

MINNIE AND A. Y.—The new concentrating mill will be started up the beginning of January. It is said that, according to measurements and estimates made by a well-known Leadville engineer for the guidance of the owners, the gross value of the ore now disclosed by these mines amounts to $3,600,000 above smelting charges. The resources are classed as follows: Concentrating ore, from 350,000 to 400,000 tons, calculated to yield a product on being concentrated five into one, that will net $29 a ton above smelting charges. First-class ore, 40,000 tons, which will return $55 a ton above cost of reduction. Second-class ore, 4000 tons, worth $15 a ton above cost of smelting.

ROBERT E. LEE.—The Robert E. Lee pump-shaft is still going down. Its present depth is about 460 feet. The last 250 feet were sunk through intrusive porphyry.

ST. KEVIN.—This company's property has been worked all summer for the purpose of putting the mine in good shape for a steady production this winter. The main shaft has been sunk fifty feet deeper, giving it a total depth on the vein of 300 feet. Additional drifts have also been driven at 275 feet, which prove the continuance of ore at depth. Nearly all the developments of the mine now show first-class ore, with great quantities of concentrating material. The smelting ore shipped to Leadville from this property ranges in value from $75 to $100 a ton. The great amount of concentrating ore in the mine led to the organization some time ago of the Hassell Milling Company, to which we refer above.

TIP TOP.—The shaft is sinking to a greater depth, and is penetrating the underlying prophyry. In following the ore-body to the eastward, the workings have encountered a cave over the ore twenty feet in length.

PUEBLO COUNTY.

There is strong talk of a Pueblo company taking charge of and operating the New England Smelter at Pueblo on or about January 1st.

PUEBLO SMELTING COMPANY.—It is reported that this company will again purchase ore in the Leadville market after January 1st.

SAN JUAN COUNTY.

CAMERON GOLD AND SILVER MINING COMPANY.—The Forest mine has shown greater improvement during the past season. The shaft is down 180 feet, and for the last 35 feet the mineral stratum on the foot-wall has shown a vast improvement, but the ore is not concentrated enough to be very valuable as yet. At the depth of 186 feet, another cross-cut will be run to the hanging-wall, and drifts started in both directions. The shaft will be continued this winter until a depth of 300 feet is reached.

NEW YORK & SAN JUAN.—The smelter treats 30 tons of ore a day, which will be the average, as it will not be possible to procure more. It is the intention to run continuously all winter.

SUMMIT COUNTY.

The Boss group of gold claims, which consists of the Boss, Virginia, and Reveille, on Farncomb Hill, at the head of Georgia Gulch, have been sold to St. Louis men.

Several claims on Discovery Hill, on the northeast side of Gold Run, among which are the Little Bonanza, Seminole, C. B. & Q., and others, have been sold to St. Louis men for about $40,000.

DAKOTA.

LAWRENCE COUNTY.

CALEDONIA.—The superintendent's report, dated the 13th inst., shows that there was ore produced from the 300-foot level, 380 tons; from other sources, 1076 tons; total, 1456 tons. The shaft advanced 10 feet, making a total of 100 feet.

GREENWOOD GOLD MINING COMPANY.—This company has been organized at Chicago, with a capital stock of $1,000,000; incorporators, Edward F. Wyman, John H. Gage, and Emmons Blaine. This company, it is stated, has bonded the Smoots group of mines, on Elk Creek, and has purchased the Greenwood mill for $60,000.

IRON HILL.—The smelter is again in full blast and turning out bullion.

GEORGIA.

LUMPKIN COUNTY.

BARLOW.—This mine, having a good supply of water, is working on full-time. The new pipe for hydraulic pressure below the mill is about completed, and work will soon begin.

IVEY.—This mine is now under lease solely to Mr. E. E. Crisson, who is preparing to do some heavy placer working. He has now about completed two new pipe lines and will soon have the "giants" at work. The mill is not running at present.

LOCKHART.—More tribute work has been done than for some time past, and the yields are much better. There is a sufficient water supply.

ILLINOIS.

ARKABANCA TIN MINING COMPANY.—This company has been organized at East St. Louis, with a capital stock of $1,000,000; incorporators, J. Van Cleve Phillips, Henry Leschen, W. P. Hasard, William Rover, and Walter H. Darby.

LINCOLN MINING COMPANY.—This company has been organized at East St. Louis, with a capital stock of $1,000,000; incorporators, William H. Bliss, Moses Greenwood, Jr., and John B. Whitehead.

KANSAS.

MCPHERSON CENTRAL KANSAS.—This company, which has been organized under the laws of Kansas, with a capital stock of $2,000,000, shares $100 each, non-assessable, owns and controls, by leases of ninety-nine years' duration, over 25,000 acres of coal and mineral lands in Central Kansas. Subscriptions for the stock will be received from the 27th inst. at the company's offices, McPherson, Kan.

MAINE.

WASHINGTON COUNTY.

MAINE RED GRANITE COMPANY.—This company, at Red Beach, has received another order of $17,000 for plant cases for the Capitol at Washington. These plant cases form part of the terrace that is building around the north, west, and south sides of the Capitol. The Red Beach granite now extends all along the south side, and this year's contract will complete the entire length of the west or principal front of the Capitol. The company has also received an order for 500 tons of rough stone for a large block of buildings in Baltimore.

MEXICO.

The Mexican *Financier* reports the following:

Mining activity has revived in the State of Sonora since the removal of the Apaches, and rich discoveries of ore are reported at various points.

A rich strike of silver ore has been made in the Sierra Rica Mountains, State of Chihuahua, where a company composed of citizens of Georgia, United States, bought, some time ago, of the Mexican owners, an abandoned mine. A four-foot vein of rich ore has been discovered, and the company has ordered a large amount of machinery.

CONETO.—St. Louis capital is about to be invested in this mine, in the State of Durango. The mine is said to have been profitably worked by the Spaniards until 1845, when in an Indian raid a large number of the miners were murdered, the works destroyed, and the entire settlement broken up. The mine was then abandoned and almost forgotten. A shaft has recently been sunk, and the vein struck at a depth of ten feet; but work was continued until a depth of twenty-five feet was reached, and a conglomerate vein laid bare four feet in thickness, with a pay-streak of eighteen inches. It is proposed to stock the mine at $2,000,000.

CORDEVANIA.—This mine, Santa Ana, State of Sonora, is reported to be looking well. The mill is to run night and day as soon as the mine is got in readiness to renew operations.

EL REFUGIO.—It is reported that this mine, near the Panuco, State of Sinaloa, is practically abandoned, although efforts are making to sell the mine in the United States.

EL TAJO *vs.* SOLEDAD.—In the lawsuit between these mining companies, in the State of Sinaloa, the former wins, the Supreme Court of the State refusing to allow the claim of the latter company to the ownership of the former's property.

LA FRANCISCA.—Additional stamping machinery has been erected at this property, State of Sinaloa.

MINA GRANDE.—This mine, near Hermosillo, State of Sonora, is making large weekly shipments of ore to Nogales for smelting.

PÁNUCO.—Excellent reports come from this mine, State of Sinaloa, which is sending a great deal of ore to Mazatlan for shipment. The company also works the Faisan mine, and the Animas, the latter proving a profitable property.

SIERRA DEL UMO.—An American company has been offered this silver mine, State of Sonora, for $170,000. An investigation is going on.

SINDA.—The assay of the gold at the mines, State of Michoacan, is reported as very high. New machinery received from the United States has been put in at these mines.

TRINIDAD.—This mine, in the Partido de Tamazula, has, in fourteen months, yielded $60,000, the ore having assayed from 40 to 80 ounces the carga. Half the stock in this property is owned by Mr. Marcelino Almada.

YAUCO.—This mine, State of Sinaloa, has levied an assessment at which some of the shareholders protest, having already spent nearly $50,000.

MICHIGAN.

The annual report of the State Salt Inspector, showing the operations of the inspection law for the year ended November 30th, 1886, shows there are in the State 136 firms engaged in the manufacture of salt, operating 140 works and 4500 solar covers, with an estimated annual capacity of 5,165,000 barrels of salt, During the year, 3,677,257 barrels were inspected, an increase of 379,854 over 1885. The actual manufacture amounted to 4,097,943 barrels, an increase of 798,169 barrels over 1885. The inspector estimates that there were in the manufacturers' hands, December 1st, 1,590,000 barrels.

COPPER MINES.

TAMARACK.—No. 1 shaft will reach the sixth level at the close of the first or at the beginning of the second week in January. The cross-cut from the shaft to the lode, on the sixth level, will be about 210 feet in length. This cross-cut is driving, drifting being in progress east and west from the bottom of a perpendicular winze sunk below the fifth level, at a point about midway between the shaft and lode, and will be completed by the time the shaft is down. A section of ground is traversed richer in mineral than any ground heretofore encountered in any of the levels above. The winze in question is six feet wide by eight feet long, and is sinking on the foot-wall of the lode, which, above the fifth level, carries an average width of about twelve feet. It is believed that the most advanced workings are penetrating copper ground that, over a greater or less extent of the bed, will be found to be fully as productive as any opened thus far in the history of the Calumet & Hecla.

MINNESOTA.

Track-laying on an extension of the Duluth & Iron Range Railroad has been begun between Duluth and Two Harbors, twenty-seven miles from Duluth. The road at present runs sixty-seven miles from Two Harbors to Tower, Minn., where are the Vermilion mines. Two Harbors has been the shipping port for these mines. When the extension of the road is completed, ore can be brought to Duluth at all seasons.

DULUTH IRON MINING AND DEVELOPMENT COMPANY.—This company has been organized in Duluth, with the following officers: Samcoe Chapman, President; J. H. James, Milwaukee, Vice-President; George C. Greenwood, Duluth, Secretary and Treasurer; James A. Sheridan, Tower, General Manager. Work will begin immediately. Sinking test-pits, putting up suitable buildings, and other necessary preliminary work is all that will be done this winter. The property is in the Lake Superior District.

MONTANA.

JEFFERSON COUNTY.

PRINCESS GOLD AND SILVER MINING COMPANY.—This company has been organized with a capital stock of $500,000, in shares of $1 each. The property lies in the Pipestone Mining District, and consists of the Princess, the Calhoun, and the Morning Star—three full quartz mining claims, covering, with intervening unclaimed and unoccupied ground, an area of 100 acres. It also includes several lead mines of assured value. The incorporators are F. T. McBride, R. B. Wallace, F. L. Burton, A. H. Headley, H. J. Blume, George F. Althoff, and A. Covert. It is the intention to erect during the ensuing season a concentrator at the Princess lode, and a smelter with a capacity of 40 tons a day, on the Jeffersen River, from three to five miles from the properties. An abundance of wood may be obtained upon the ground, while enough limestone and iron ores for fluxing purposes are found at hand. The company is about to purchase the necessary plant for the works.

SILVER BOW COUNTY.

BLUE BIRD.—The mill continues to work well, the 60 stamps crushing 95 tons, or over one and a half tons to the stamp daily, which is considered very good work. The mine is said to be improving daily in the extent and richness of its mineral possessions.

BLUEJAY.—This mine, which is among the best undeveloped properties in the county, has been bonded to J. C. C. Thornton from Archie McBride, for $40,000.

NEVADA.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle:*

BALTIMORE.—The hoist and pumping plant at this mine, which is the most powerful on the Comstock, with the exception of that at the Union and Combination shafts, has been started up. It is nearly new, having been set up but a short time before the mine shut down. The 225 and 450 levels will be reopened immediately. The extraction of ore will begin immediately. There is a five-stamp mill near the shaft in which the ore extracted will be crushed.

CHOLLAR.—The north drift from the station on the 350 level in the old shaft cut through a bunch of ore, and shows heavy clay and porphyry in the face.

CONSOLIDATED CALIFORNIA & VIRGINIA.—The superintendent's report for the week ended the 11th inst. shows that, on the 1400 level, a winze excavating below the track-floor of the south drift, 300 feet south of the Consolidated Virginia shaft, has passed through the ore mentioned in the last report, the vein dipping to the east at an incline, while the winze is sinking vertically. The bottom is now in vein-matter and low-grade quartz. This winze will connect with the south drift on the 1500 level in eight or ten days. On the 1435 level, the winze below the track-floor of the east cross-cut is down 25 feet, passing through good ore. It is now in vein-material carrying stringers of low-grade quartz. On the 1500 level, the drift running north from the Consolidated Virginia shaft was advanced 50 feet; total length, 318 feet. During the week, this drift passed through 10 feet of ore giving high assays. This drift will connect with the uprise above the 1650 level in a few days. This will improve the ventilation and facilitate explorations on the 1500 level. The usual quantity of ore is extracted from the various levels in the mine. During the week ended the 11th inst., 1079 tons of ore were shipped to the Morgan mill, and 1730 tons to the Eureka mill. The average value of all the ore milled during this period, according to the assays from the battery samples, was $34.35 a ton. Bullion valued at $75,000 has been shipped. The weekly bullion output shows no signs of diminishing, and the product for the week ended the 18th inst. will probably exceed that of the previous week by $25,000.

GOULD & CURRY.—On the 425 level, the south drift from the main west drift is penetrating clay mixed with quartz.

HALE & NORCROSS.—The southeast drift sent out from the head of the incline on the 1300 level is skirting a vein that shows streaks of ore at points where it diverges slightly from its regular course along the hanging-wall. The second and seventh stations in the old shaft are reopened, and the virgin ground lying to the southward is undergoing exploration.

IOWA.—The old adit tunnels are reo ning and the

surface machinery put in repair preparatory to a resumption of operations in the shaft.

NORTH GOULD & CURRY.—The shaft is draining preparatory to sinking.

OCCIDENTAL.—At a point in the north incline winze, connecting the upper and lower tunnel, 48 feet below the track-floor of the upper tunnel, a south drift was started and is out 29 feet. Extracted eight tons of low-grade ore during the week. In the lower tunnel uprise No. 2, 55 feet north from No. 1 uprise, the roof is in quartz giving low assays.

POTOSI.—The south winze below the track-floor of the southeast drift, 350 feet south of the Chollar line, is just fairly under way, and is following the downward extension of the ore development. Samples from the bottom give it an average assay value, it is said, of $75 a ton.

SAVAGE.—The south drift on the 500 level is advancing to connect with the shaft. A slight flow of water in the face of the east cross-cut caused a suspension of operations at a point 20 feet from the lateral drift. A west cross-cut is going in opposite the east cross-cut, and is showing low-grade ore. High-grade ore is said to be still showing in the bottom of the winze, which is down 28 feet below the track-floor of the south drift on the 600. The south drift on this level lacks about 40 feet of connecting with the shaft. The south drift on the 825 level has stripped the vein for a distance of 53 feet, which will be explored by sending in cross-cuts after connection is made with the shaft. The vein on the 1640 level is opening up north and south of the Sutro tunnel line. It shows a breadth of 42 feet of ore, two feet of which is black sulphurets of high grade.

SUTRO TUNNEL.—The company has completed the laying of the track from the tunnel line to the point in the Savage branch on the 1640 level, where the ore development recently made is opening up. The ore extracted will be run out to the mouth of the main tunnel at Sutro and hauled to the Rock Point mill at Dayton, distant less than two miles. This ore is alleged to assay $40 a ton on an average. The Tunnel Company is to receive 25 cents a ton for delivering the ore at the mouth of the tunnel, in addition to the regular royalty of $1 a ton to which it is entitled.

UTAH.—It is rumored that this mine, having been assessed to the full value of its capital, the trustees will increase the number of shares to 100,000, in place of 20,060, the present number in the mine.

YELLOW JACKET.—A press dispatch, dated the 21st inst., states that this mine is on fire—giving no further particulars.

NEW MEXICO.

SOCORRO COUNTY.

FOUR HAWKS MINING AND MILLING COMPANY.—This company has been organized in St. Louis, with a capital stock of $2,000,000, shares $10 each. The incorporators are John A. Miller and John W. Fleming, of Silver City, New Mexico; and Redmond Cleary, John Mullaly, James L. Huse, and Thomas H. Jacobs, of St. Louis, Mo.

NORTH CAROLINA.

ALEXANDER COUNTY.

EMERALD & HIDDENITE.—The finding of several pockets or cavities in the formation that have yielded a number of gems, the finest of them being hiddenite—emerald green variety of spodumene—is reported. The ground at this locality yields large numbers of quartz crystals, most of which are found loose in the soil. All of these quartz crystals are more or less modified, and are generally found in clusters or pockets. At this same locality, some extraordinary garnets are found. They are exceedingly brilliant, and are of a light cherry-red color.

DAVIDSON COUNTY.

GENESEE.—This company, which operates the Steele gold mine, is now running a forty-stamp mill, and a Golden Gate concentrator, reducing about 80 tons of ore, with satisfactory results. It is said that a 100-stamp mill may be erected in the spring.

JACKSON COUNTY.

Arrangements are perfecting to develop kaolin and talcose property, as well as nickel and chromic iron, near Sylva, by Col. J. B. Killebrew, H. B. Gniffke, and others.

RANDOLPH COUNTY.

NEW HOOVER HILL GOLD MINING COMPANY, LIMITED.—The result of milling for November was 284 tons of ore crushed, producing 61 ounces of gold of the approximate value of $1040.

TENNESSEE.

MONROE COUNTY.

TENNESSEE MARBLE COMPANY.—This company has been incorporated at Chattanooga, with a capital stock of $100,000, by J. T. Hill, C. E. Smith, P. C. Daly, Samuel R. Reade, and others. It will enlarge the works and develop extensive quarries in Monroe County. The same persons have, it is stated, formed a company to build a railroad to the quarries.

UTAH.

WASHINGTON COUNTY.

CHRISTY.—Official advices to us show the production for November to have amounted to $18,262.63, wholly silver.

VIRGINIA.

ROANOKE COUNTY.

The people who recently leased a tract of land near Roanoke containing large deposits of zinc, are reported to have sold their lease for $200,000 to Pennsylvania capitalists. This tract adjoins that recently purchased by a syndicate for $600,000.

WISCONSIN.

It has been suggested recently that the office of commissioner of mineral statistics be created in Wisconsin, and it is more than probable that a bill to that effect will be presented in the Legislature.

BADGER STATE MINING COMPANY.—This company has been organized with a capital stock of $1,000,000, shares $25 each. The incorporators are C. F. Ainsworth, H. A. Bright, A. S. Trow, J. E. Darling, E. A. Leclaire, F. Johnson, T. B. Mills, J. H. Mills, J. H. Allen, and A. J. Yungbluth. The company has options on 320 acres near Hurley. Operations will begin at once.

TAYLOR COUNTY.

MEDFORD LAND AND MINING COMPANY.—This company has been organized at Medford, with a capital stock of $1,000,000, to work the iron mine recently opened three miles from Medford. The ore is a soft hematite.

BULLION PRODUCTION FOR 1886—SPECIAL OFFICIAL REPORTS.

MINES.	States.	Month of November.	Year from Jan. 1st, 1886.
		$	$
Alice, G. S	Mont.	.....	955,024
Belmont	Nev.	——	3,255
Boston & Montana, G.	Mont.	24,665	485,711
Caledonia, G.	Dak.	——	172,960
Christy, S.	Utah.	18,263	249,532
Chrysolite, S.	Colo.	**12,517	200,095
Colorado Central, S.	Colo.	20,227	246,438
Daly, S.	Utah.	61,826	677,884
Deadwood-Terra, G.	Dak.	.....	507,334
Derbec Blue Grav., G. S.	Cal.	.. ....	152,367
Elkhorn, G. S.	Mont.	.....	175,620
Eureka, S. L.	Nev.	——	147,559
Father de Smet, G.	Dak.	——	61,376
Freeland, G. S. C	Colo.	19,372	273,888
German Consolidated, G	Colo.	.....	53,673
Granite Mountain, S.	Mont.	158,600	1,428,300
Head Center Cons., S.	Ariz.	——	4,633
Head Center & Tranq., S.	Ariz.	——	25,818
Hecla, G. S. L. C	Mont.	.... ..	251,303
Helena, G. S. L. C.	Mont.	... .	240,234
Holmes, S	Nev.	——	403,521
Homestake, G.	Dak.	... ...	896,053
Hope, S.	Mont.	15,100	146,018
Independence, S.	Nev.	——	15,000
Iron Hill, S.	Dak.	**24,000	383,346
Iron Silver, S. G.	Colo.	——	516,319
J. D. Reymert, S.	Ariz.	1,355	5,771
Kentuck, S.	Nev.	——	*3,346
Lexington, G. S	Mont.	66,185	797,011
Montana Limited, G. S.	Mont.	189,100	1,522,800
Moulton, G. S.	Mont.	45,843	678,236
Navajo, G. S	Nev.	... .	138,944
New Pittsburg, S	Colo.	.....	6,330
North Belle Isle, G. S.	Nev.	——	20,285
Ontario, S.	Utah.	.....	1,143,238
Plymouth Consolidated, G.	Cal.	61,450	565,511
Plutus, G. L. C	Colo.	6,588	140,993
Ropes, G. S.	Mich.	4,357	36,995
Small Hopes Cons., S.	Colo.	84,909	966,977
Standard Consolidated, G.	Cal.	27,173	204,385
Tombstone, G. S. L.	Ariz.	——	†**491,070
Total		.....	$15,389,866

G., gold; S., silver; L., lead; C., copper; M., mica. Silver valued by the different companies from $1@$1.29 per ounce; gold, $20.67. † Not including value of lead and copper. ** Silver valued at $1.29. * Royalty. ‡ Net. ¶ Ore sales. | Not official. —— No shipments during month mentioned.

MARKETS.

NEW YORK, Thursday Evening, Dec. 23.

Silver.

DATE.	London. Pence.	N. Y. Cents.	DATE.	London. Pence.	N. Y. Cents.
Dec. 18.	46¼	99⅞	Dec. 22	46	99½
20..	46¼	par	23	46	99½
21..	46	99½	24	46	99½

Silver market closes dull, without feature.

Copper.—This market continues very quiet and strong, with 12 cents quoted for Lake, and 10¾ cents for Orford and Baltimore casting brands, and 11½ for Orford refined electrolytic. This is a comparatively new brand in the market, and is said to be found well adapted to many, if not all, the uses for which it has been thought Lake copper alone was suitable.

The high freight rates from the Lake, to which we alluded last week, will no doubt keep copper there until the price here has advanced to a corresponding degree.

The Anaconda is now running full. On the 1st of December, it had three matting-furnaces going. On the 3d, as our correspondent telegraphed, 9 furnaces were running; and on December 12th, 18 furnaces were running. The object of starting up the mine and works without any reduction in wages, except in the mill, where the wages of the deputy sheriff far outbalanced the saving, is one of those things "no fellow can find out." The London market is quoted to-day £38 17s. 6d. for Chili Bars, and £43 for Best Selected, at which prices Anaconda will not get as much for its matte as when the works were closed some months ago.

Tin.—This market has been quiet and with but little change except a slight decline from 22·35 cents a week ago to 22¼c. for prompt shipment, to-day, with sales during the week of about 120 tons at the Metal Exchange. London cables to-day quote spot Straits £100 5s.; 3 months, £101. Cables to the Metal Exchange state that the Billiton sale to-day went off at an average of 60⅜ fl. per 50 kilos., which is a slight decline from the last sale.

Lead.—Sales aggregating perhaps 300 tons, mostly in a jobbing way, at 4·30c. and a little at 4·35c. sum up this market for the week. No change is anticipated for some time to come.

Manufactures.—Lead pipe is quoted at 6¼c. and Shot at 7¼c., less the usual 20 per cent discount. Shot is $1.60 for Drop and $1.85 per bag, 25 pounds for Buck and Chilled. Tin-lined Lead Pipe, 15c., less 20 per cent discount.

White Lead.—The combination prices are as follows: 7¼c. per pound net in quantities of less than 500 pounds, and 7 days, or 2½, 60 per cent discount for cash in 15 days from date of invoice. For 25-pound, 12½-pound, and 1 to 5-pound assorted cans, an additional charge of 1@1½c. and 2½c. respectively, is made. The rebates are 2 per cent on less than 10 tons purchased during the year, 3 per cent on 10 to 25 tons, and 5 per cent on 25 tons and over. Rebates are payable at the end of the year to buyers who have observed the rules of the Association.

Messrs. John Wahl & Co., of St. Louis, telegraph us as follows to-day:

Market gradually drooping; the ending week only records retail sales at from 4·07½c. down to 4c.

Messrs. Everett & Post, of Chicago, telegraph us as follows to-day:

There is but little doing, and demand is from hand to mouth only. Prices are nominally 4·10@4·12½c. However, there are no buyers in the market, and consequently it is hard to give figures. Consumers generally are waiting the turn of the year.

Spelter.—The London market is cabled £14 7s. 6d. for Silesian. Our market here is advancing, and is strong. Western brands have again advanced. We quote 4·55@4·60 in store for Western brands, and 6½@7c. for New Jersey.

New Jersey Zinc Oxide, 4@4½c., according to grade.

Nickel.—We quote 60c.

Bismuth—Is quoted at $2@$2.25 a pound.

Aluminium—Is quoted at 90c.@$1 an ounce.

Quicksilver.—There is no change to report, and we continue to quote 52½c. a pound here, and in London £7

IRON MARKET REVIEW.

NEW YORK, Thursday Evening, Dec. 23.

American Pig.—This market is extremely strong, and the great sale of the Thomas Iron Company on the basis of $20 for No. 1 X, and which in one week booked orders for 151,000 tons, appears to have had the effect of whetting the appetite of consumers rather than surfeiting them.

The company has refused orders for more than 25,000 tons of pig-iron, including offers of $21 a ton for No. 1 X. There is certainly no occasion for any excitement among consumers; for there will be no "iron famine;" but at the same time, there is little doubt but that prices will reach a considerably higher level before long. We quote No. 1 X, $21@$21.50; No. 2 X, $20; and Forge, $18@$18.50.

The market never was in better condition, and the year closes with general satisfaction as to the past, and with bright prospects for the future. The market is altogether in favor of sellers.

Inquiries are made for Lehigh anthracite pig by parties in Milwaukee and Chicago, a feature that has not been noticed in the trade for many years past.

Scotch Pig.—We quote: Coltness, $22@$22.50; Gartsherrie, $21; Summerlee, $21; Dalmellington, $20.50; Langloan, $21.50; Clyde, $20.50@$21; Glengarnock, $19.50@$20; Eglinton, $19.50. Cables to the Metal Exchange to-day quote: Coltness, 53s. 6d.; Langloan, 50s.; Summerlee, 52s.; Gartsherrie, 49s.; Glengarnock, 45s. 9d.; Dalmellington, 45s.; Eglinton, 44s. 3d.: Warrants, 43s. 10d.; Middlesboro', No. 3, 33s. 4d. Freights are 10s.

Bessemer Pig.—The market for Bessemer Pig shares in the general strength, and is advancing. We hear of large sales in Philadelphia at $20.25 for Foreign, and prices for Domestic have also advanced. We quote $19.50@$20 at furnace for Domestic, and $20.50@$21 for Foreign.

Spiegeleisen.—The demand continues active. We quote $28.50@$29 asked for both English and German 20 per cent Spiegel.

Rail Fastenings.—We quote Spikes, 2·25@2·40c. a pound; Angle Fish-Bars, 2c.; Bolts and Nuts, 3@3¼c.

Scrap.—A considerable advance has taken place in Scrap, and $23 is offered, with very little obtainable. We quote $23 for Wrought Yard Scrap. The tendency is decidedly upward.

Cast-Iron Pipe.—We quote $29 for 36-inch pipe to $35 for 4-inch.

Steel Blooms and Billets.—The activity in the rail business, and the prospect of higher prices in the early future, make this market strong and active. We hear of purchasers of quite large quantities of foreign Rail Blooms at $19.25, but that is already "a price of the past." We quote $29.50@$30 for Rail Blooms. Billets, $30@$31, according to size and quality. Chateaugay charcoal billets, 3¾ inches, are worth $47@$48 at Plattsburg.

Steel Plates.—We quote: Tank, 2·75c.; Boiler and Ship Plates, 3@3¼c.; Flanges, 3½@3¾c.; Extra Flange and Fire-Box Plate, 4¼@4½c.

Steel Rails.—Rails are still advancing, and in this market no quotations are made below $37, while we hear of considerably higher figures being asked, since most of the mills are quite full of orders and unwilling to take more. Quotations are more or less nominal, but we quote at Eastern mills, $37@$38, and Pittsburg, $38@$39, with higher figures "in sight."

We hear of sales of 10,000 tons English (Cannel) rails to C. P. Huntington, San Francisco delivery. English rails can not be laid down here below $39.50, with an advancing market in England.

Structural Iron and Steel.—We quote: Angles, 2¼@2½c.; Tees, 2½@2¾c.; Steel Angles, 2·50@2·60c. American Beams and Channels, 3@3½c., base from dock.

Merchant Steel.—The mills report continued activity. We quote: American Tool Steel, 7½@10c.; special qualities, 11@20c.; Crucible Machinery, 4@4·50c.; Bessemer and Open-Hearth Machinery, 2½c., with a large and steady consumption.

Plate Iron.—The demand is good. We quote: Common Tank, 2·30@2·40c.; Refined, 2·40@2½c.; Flange Iron, 3¼@3½c.; Extra Flange, 4@4·25c.

Bar Iron.—We quote: Refined at 1·75@2c.; Common, 1·65@1·75c., with a good demand for the season, and an "advancing" feeling in the market.

Old Rails.—Old Rails are still extremely scarce, and prices are strong. We quote $24.50@$25 for Tees and $26 for Double-Heads. We hear of a sale of Old Double-Head Rails c.i.f. Philadelphia at 79s., the highest price yet reached, and equivalent to nearly $26.25.

Philadelphia. Dec. 23.

[From our Special Correspondent.]

Brokers do not claim to be doing very much business in pig-iron, but they have a great deal of inquiry, with some offers that are a little below the current market quotations. Consumers are willing to buy at a little less than sellers ask. Inquiries this week have covered about 40,000 tons of forge and foundry in the shape of inquiries and offers. Average No. 1 is $20, and very little material can be had at any thing less. A few sales of 100-ton lots were made at that figure, and smaller lots went at $20.50 for January delivery. A few early deliveries of No. 2 were contracted for at $18.50. Makers continue their conservative policy of hanging back and letting consumers come or stay as they please. Forge iron is quiet but very firm at $17.50, with several good brands held at $18, and some few sales at that figure, amounting this week to about 1500 tons, so far as heard of.

Muck-Bars.—Muck-Bars are quiet at $32 at mill.

Foreign Material.—Twenty-five thousand tons of foreign material have been sold, and from 10,000 to 15,000 tons will be closed for before to-morrow evening. These figures may be increased any hour, as there are half a dozen buyers in the market to-day who may conclude to close now rather than after the holidays. A large lot of Rail Blooms were ordered at $29; a large lot of Bessemer pig at $20.25; and a large lot of Nail Slabs at $30.50. It looks as though an advance would be made, and brokers say some big business is very near consummation.

Merchant Iron.—Merchant iron is strong and steady at 2c. for small lots, with the customary shadings for Medium and Common.

Nails.—Nails are quoted at $2@$2.20, and in view of the shut-down, prices incline to firmness, but no advance will be attempted at present.

Plate and Tank Iron.—No change has taken place, and the only thing contributed in the shape of news by manufacturers this week is, that large specifications are promised next week. Tank, 2·40c.; Plate, 2·30c.

Sheet-Iron.—Card rates are firmly held, and business is of moderate dimensions.

Structural Iron.—Manufacturers' agents just returned from Western markets report negotiations nearly closed for large supplies of angles, beams, channels, and tees at full card rates.

Skelp Iron.—Skelp is a tenth higher, and all the business offered is not taken.

Steel Rails.—Steel Rails are firm at $36. Business reported this week in this market, 15,000 tons. Strong prospects for an advance to $36.50.

Old Rails.—Tees are held at $25 firmly. One thousand tons of double-heads have been ordered. Brokers have inquiries pending for from 10,000 to 12,000 tons of all kinds of old material.

Pittsburg. Dec. 22.

[From our Special Correspondent.]

There has been no falling off in the demand for raw iron. Buyers are still disposed to invest liberally. Furnace-men would prefer not to sell at present prices. On the other hand, iron must be had. Prices are a shade higher, and the market stronger. When an order reaches the furnace for a round lot, the answer invariably comes back, "Have none to sell at present. You will have to wait until orders now on the books have been filled." Many of the furnaces have contracts on hand that will keep them engaged for the rest of the year, and even longer. At the same time, while not absolutely refusing new business, they are "beating about the bush" whenever they can, to keep themselves in such a shape that they can profit by any anticipated advance. Low grades of iron are also moving up a shade, and are offered more freely. Most of the consumers now in the market are those who require the finer brand of iron. Consumers would, no doubt, purchase liberally, if they had their own way. The sales of imported iron and steel in this market have been unusually large. Correct figures are very difficult to obtain until too late to be of any real value. In the mean time, no one is purchasing on speculation. As in former times, when prices were on the up grade, the greatest danger now is, that prices will be forced up out of all reasonable proportions. We hope this will not be the case. Some, however, are of that opinion: time will tell.

Muck-Bar.—Scarce and higher.

Old Rails.—The advance is maintained.

Pig-Iron.—Following are the current rates:

Coke or bituminous:	$	$
Foundry No. 1	20.00	@20 50
Foundry No. 2	19.00	@19 50
Gray F., No. 3	18.50	@19.00
" " No. 4	18.00	@18.50
White	17.50	@18.00
Mottled	17.75	@18.00
Silvery	17.00	@19.00
Bessemer	20.75	@21.25
Charcoal:		
Foundry No. 1	23.00	@24.00
Foundry No. 2		@22.50
Cold-Blast	26.50	@29.50
Warm-Blast	24.00	@25.00
20 p. c. Spiegel	30.00	@30.50

	$	$
Muck-Bar	32.50	@33.00
Steel Blooms	32.00	@33.00
Steel Slabs	30.00	@33.00
Steel Crop Ends		@23.50
St'l Bl'm Ends	23.00	@23.50
Old Iron Rails	27.50	@28 50
Old Steel Rails	25.50	@26.00
No. 1 W. Scrap	20.50	@21.00
No. 2 W. Scrap	19.00	@19.50
Steel Rails	36.00	@36.50
" light sect's	37.00	@40 00
Bar Iron	1.90	@ 2.00
Iron Nails (60 days)	too unsettled	
Steel Nails	"	"

Nails.—Iron, 2·30c. Steel, 2·40c.; less 10c. per keg on car-load lots 60 days; 2 per cent off for cash in ten days.

Private sales, so far, have been light. There are several lots under negotiation that will not be closed in time for this report.

Tons.	SALES SINCE LAST REPORT.				
150	Bessemer,	Coke and Coal	S'd Lake Ore	$21.00	cash.
300	" at furnace,	"	"	20 50	cash.
100	Gray Forge,	"	"	19.00	cash.
100	G. Fo., all Ore,	"	"	19.75	cash.
100	" "	"	"	19 50	cash.
50	No. 1 Foundry	"	"	20.75	cash.
300	Southern Mottled,	Coke	Native Ore	18.00	cash.
200	Gray Forge,	Coke	Native Ore	19.00	cash.
200	"	"	"	19.00	4 mo.
100	"	"	"	19.00	cash.
50	"	"	"	19.00	cash.
20	No. 2 Fo.,	"	"	19.75	4 mo.
20	Mottled,	"	"	18.00	4 mo.
200	Gray Forge,	Cold Short,	Anthracite	18.00	cash.

Louisville. Dec 21.

[Reported by GEORGE H. HULL & Co.]

The market for pig-iron is very strong, with a continued upward tendency, and prices are from fifty cents to one dollar a ton higher. Many consumers had bought ahead and believed themselves running short on account of their increased needs. Most furnaces are largely sold ahead, and not so large a proportion of consumers have bought correspondingly, and the indications are, that iron will continue to be scarce and continue to advance.

We quote for cash in round lots as below:

PIG-IRON.

Southern Coke, No. 1 Foundry	$20.00@$20.50
" " No. 2 "	19.00@ 19.50
Hanging Rock Coke, No. 1 Foundry	20.00@ 20.50
" " Charcoal, No. 1 Foundry	22.00@ 23.00
Southern Charcoal, No. 1 Foundry	21.00@ 22 00
Southern Coke, No. 1 Mill, Neutral	18.00@ 18.50
" Charcoal, No. 1 Mill	18.50@ 19 50
White and Mottled, different grades	16.00@ 16.50
Southern Car-Wheel, Standard Brands	27.00@ 28.00
Hanging Rock, Cold	28.00@ 30 00
" " Warm-Blast	22.00@ 23.00

COAL TRADE REVIEW.

NEW YORK, Thursday Evening, Dec. 23.

Statistics.

Production Anthracite Coal for week ended December 18th, and year from January 1st:

Tons of 2240 lbs.	1886.		1885.	
	Week.	Year.	Week.	Year.
P. & Read. RR. Co.	232,190	11,291,703	251,797	11,138,611
L. V. RR. Co.	154,541	6,042,598	162,372	6,015,045
D., L. & W. RR. Co.	118,228	4,953,968	98,023	4,910,830
D. & H. Canal Co.	89,833	3,487,761	75,528	3,281,924
Penna. RR.	57,026	3 234,045	68,147	3,189,919
Penna. Coal Co	22 473	1,443,771	31,805	1,470,013
Penna. Canal Co.		470,951		425,528
Total	674,391	30,904,797	687,672	30,431,870
Increase		472,927		
Decrease	13,281			

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1881	27,991,164	1883	30,566,188
1882	28,860,764	1884	30,863,856

Production of Coke on line of Pennsylvania RR. for week ended December 18th, and year from January 1st:

Tons of 2000 pounds.

	1886.		1885.	
	Week	Year.	Week.	Year.
Allegheny Region	11,833	197,826	4,138	181,099
West Penn. RR.	2,016	104,662	2,188	58,100
Southwest Penn. RR	60,058	2,636,163	58,743	1,825,482
Penn. & W. Region	6,319	320,111	5 845	235,185
Monongahela	2,250	141,864	3,172	95,762
Pittsburg Region		108		
Snow-Shoe	657	27,234	652	23,562
Total	83,233	3,427,968	74,738	2,419,190

Production Bituminous Coal for week ended December 18th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1886. Week.	1886. Year.	1885. Week.	1885. Year.
Phila. & Erie RR...	.....	16,756	2,680	29,085
*Cumberland, Md..	55,079	2,446,765	39,762	2,715,444
*Barclay, Pa.....	3,977	173,103	4,431	222,232
*Broad Top, Pa.				
H. & Broad Top RR.	9,200	371,444	.....	162,608
East Broad Top....	.....	.....	.....	.....
Clearfield Region, Pa.				
Snow Shoe.....	3,563	107,324	3,596	145,020
Karthaus (Keating)	4,872	144,116	4,407	133,809
Tyrone & Clearfield	48,040	2,147,519	61,046	2,806,554
Alleghany Region, Pa.				
Gallitzin & Mountain....	10,867	647,933	11,927	530,106
Pocahontas Flat Top Coal.				
Norf'k & West. RR.	18,047	834,715	12,352	576,553
Kanawha Region, W. Va.				
Ches. & Ohio RR..	†21,529	1,177,746	†28,174	1,065,752
Total.....	175,174	8,067,431	168,375	11,386,264

* Tons of 2240 lbs.
† Week ended December 7th.

WESTERN SHIPMENTS.

Pittsburg Region, Pa.				
West Penn RR.....	7,663	308,845	5,937	215,017
SouthwestPenn.RR.	3,985	149,222	2,638	98,041
Pennsylvania RR...	4,559	268,119	4,567	230,703
Westmoreland Region, Pa.				
Pennsylvania RR...	30,263	1,240,519	31,008	1,160,221
Monongahela Region, Pa.				
Pennsylvania RR...	6,271	386,535	4,178	264,234
Total.....	52,741	2,353,240	48,378	1,968,216
Grand total.....	227,915	10,420,671	216,753	13,354,480

Anthracite.

The anthracite coal trade is in good condition. The larger sizes are in fair request. Stove does not seem to improve, and the impression prevails that it is in greater supply than a week ago. Chestnut coal is very scarce, and is bringing better prices than stove. In the smaller sizes, there is practically a famine. For good Pea coal, it is stated that $3 a ton is obtainable.

On Monday, the January allotment was fixed at $2,500,000 tons. The actual shipments, without a combination to regulate the production, during the same month this year, were 2,338,277 tons. The action of the committee does not meet with the entire approval of the trade. Some think that the output for next month should not exceed 2,250,000 tons, while others think that 2,000,000 tons will be all that the trade will comfortably take.

During the month of November, the average price received by the Delaware, Lackawanna & Western Railroad Company for all coal sold f.o.b. vessels at Hoboken, was $2.88 a ton. This is about 11 cents less than for October, 16 cents less than in November last year, and 70 cents less than in November, 1884. The very low average last month is said to be due to a large proportion of pea coal having been sold in this market, and a very small proportion of stove and other higher-priced sizes. We congratulate the individual shippers on the conditions that gave them such liberal tolls on their coal. The higher prices received for the small sizes this month will probably increase the average.

To effect the organization of the present coal combination occupied about three months' time, and the want of it cost the coal trade not less than $10,000,000. In but a little over three months, it will expire by limitation. At least once every year, for the past ten years, it has looked as though a new coal combination could not be formed, and still it has been, with great regularity, after a good deal of foolish wrangling on the part of the managers, at a cost to the trade of a great many millions of dollars.

The coal combination, with the producers, at least, is a very popular institution. The coal trade expects that there will be one in 1887, and that much greater benefits will be derived from it than have been secured under the existing one. In discussing with a gentleman who has been prominent in the coal trade for years, the prospects of arriving at an understanding for next year, he said: "If the presidents will stay in their offices, and leave the matter to the practical men of the trade, who have managed the business since the present combination was formed, there will be no trouble." This is a suggestion well worthy of the serious consideration of the presidents.

On January 1st, the Jersey Central will be an independent road. The Reading Company will have to provide it with an allotment under the coal combination. As each shipper on the Jersey Central has an allotment at present, it may appear that there should be no trouble in making a percentage for that railroad. This, however, is by no means certain. At all events, one of the first duties of the managers of the companies in 1887 will be to determine as quickly and with as little bickering as possible the basis for the next combination. Although there is probably no cause for alarm, yet it is doubtful whether any thing can be accomplished without some wrangling and the usual amount of bluffing. The trade for next year promises to be large, and also profitable, if well managed. It will not be a year in which the companies can afford, or will be willing, to fight. It is probable that concessions will have to be made by some of the companies, as a revision of the percentages of a division of the entire trade will very likely be forced, and this fact should be promptly recognized. There is every indication that the Pennsylvania Railroad will *take* a larger percentage in 1887. This will probably amount to 1 or 2 per cent increase. Mr. Corbin is an unknown quantity; but the public has concluded that he is, at least, not overgenerous in a business transaction, and the impression is strong that he will firmly stand for an increased percentage for the Reading. The probabilities are, that the New York companies will be called upon to make concessions of three or four per cent at least. If this is the case, the earlier it is known the better.

It is not our intention to create a feeling of alarm. There is no necessity for such a feeling at present, and only the actions of the managers of the companies can create a cause for it, and at the present time we are not informed of any intended official actions that should in the least disturb the situation. The time for discussing the combination question has arrived, and, as usual, we open the ball.

Mr. John H. Jones, official accountant, furnishes the following statement of the anthracite coal tonnage for the month of November, 1886, compared with the same period last year. This statement includes the entire production of anthracite coal, excepting that consumed by employés, and for steam and heating purposes about the mines:

COMPANIES.	Nov., 1886.	Nov., 1885.	Difference.
Phila. & Reading RR...	1,246,875	1,174,452	I. 72,423
Lehigh Valley RR.....	627,333	660,545	D. 33,212
Del., Lack. & West. RR.	529,109	528,238	I. 871
Del. & Hud. Canal Co..	349,845	384,867	D. 35,022
Pennsylvania RR	312,204	308,964	I. 3,240
Pennsylvania Coal Co.	146,528	159,086	D. 12,558
N. Y., L. E. & W. RR...	65,742	62,964	I. 2,778
Total	3,277,636	3,279,116	D. 1,480

COMPANIES.	For Year 1886	For Year 1885.	Difference.
Phila. & Reading RR..	10,687,453	10,545,064	I. 142,389
Lehigh Valley RR	5,587,537	5,478,388	I. 109,149
Del., Lack & West. RR	4,694,389	4,598,890	I. 95,499
Del. & Hud. Canal Co.	3,216,854	2,983,659	I. 233,195
Pennsylvania RR	3,190,325	3,092,337	I. 97,988
Pennsylvania Coal Co.	1,287,204	1,355,043	D. 67,839
N. Y., L. E. & W RR..	661,250	573,322	I. 87,927
Total..... ..	29,325,012	28,626,704	I. 698,308

The stock of coal on hand at tide-water shipping points, November 30th, 1886, was 393,202 tons; on October 31st, 1886, 440,962 tons; decrease, 47,760 tons.

The stocks at the end of the month indicate that the trade during November was very much better than it appeared to be, and that the only trouble was in an over-stock of stove coal, which, in its decline in price, demoralized other sizes.

We quote ordinary free-burning coals, net, f.o.b. vessels, as follows:

	Week ended Dec. 24.	Dec. 17.	Dec. 10.
Lump.....	$3.40	$3.40	$3.40 .....
Steamboat.....	3.40	3 40	3.40 .....
Broken.....	3.30@3.40	3.30@ 3.40	3.30 .....
Egg.	3 40@3.60	3.60	3 60 .....
Stove.....	3.75@4.00	3.85@ 4.00	3.85@ 4.10
Chestnut.....	3.65@4.00	3 65@ 3.80	3 50 .....
Pea.....	2.50@3.00	2.25@ 2.40	2.25 .....
Buckwheat... ...	1.75	1.75	1.70 .....
Dust.....	1.20@1.25	1.35@ 1.40	1.25 ....

On Saturday the Reading Company had at Port Richmond, 33,471 tons of coal, a decrease for the week of 644 tons.

There has been a rumor that Messrs. Williams & Peters were to be made the New York agents of the Reading Company, and that the company would give up its own office and dismiss the entire force now employed in this city; but this rumor is not confirmed, but it is claimed that the business is now done at a far less cost to the company than if the ordinary commission were paid.

Bituminous.

There is a very good demand for this coal, which is exceedingly scarce, owing to a great scarcity of cars in which to transport it. Prices are quite firm at circular or better. The demand is so urgent in many cases that fancy prices could be obtained if the producers were inclined to take advantage of the buyers. Railroads, steamship lines, and manufacturing establishments are in urgent need of coal through the inability to get supplies on contracts made earlier in the year, and all the indications point to greater embarrassment.

Buffalo. Dec. 22.

[From our Special Correspondent.]

Let me wish you and your readers a MERRY CHRISTMAS! I hope that all have had, as a rule, many thoughtful hearts to remember them at this festive season, and that the spirit of the times has prompted them to do good by stealth among the poor and sick.

Inquiry among dealers in coal, whether it be bituminous or anthracite, has resulted in no new features, excepting that cars are obtained more freely, but yet materially less in number than the necessities of the trade require. Further, that the demand continues good, both for coal and coke, and that prices are unchanged. Holiday thoughts are uppermost in the people's minds at present; and as the weather is very seasonable here, alternating cold, wind, and snowstorms, and slight thaws in the middle of the day, the crowds of buyers and sight-seers are happy, and the one-ton orders for coal are numerous enough to keep dealers busy.

Next year's promises for our city's prosperity are liberal. New railroad termini are talked of. The New York Central Railroad car-works are to be brought here; several new propellers are contracted for; docks, shutes, etc., are to be increased and enlarged; new building enterprises of all kinds; new industries, and old ones to have increased capacity and facilities. Real estate is enhancing in value rapidly, and large tracts of land in the vicinity of our railroad yards have been put on the market, and sold rapidly at large figures.

The Buffalo, Rochester & Pittsburg is building 500 additional coke-ovens at Punxsutawney. With the 500 at present constructed, this company will then have one of the largest plants of the country.

The Getzville gas well that was alluded to in last week's communication has developed a feature that has destroyed for fuel purposes the hopes of the projectors; namely, at the increased depth drilled, salt water rushed in and the gas vanished! Operations have been suspended.

Mr. J. J. Albright, the general sales-agent here of the Delaware & Hudson Canal Company, has resigned. On the 1st of January, Mr. Thomas F. Torrey will assume the position thus vacated.

An exchange says that a discovery of coal in the Canada Northwest territories promises to be a matter of great importance to the development of that section of the country. Cheap fuel is an important matter, not only to the Canadian but to American settlers, and the coal discovery promises to supply the want fully. News has been received that the mining company that recently began operations at Banff, Northwest Territory, has struck a seam of anthracite coal, seven feet six inches in diameter. There are six seams of hard coal in this location, varying in thickness from three feet to the monster just uncovered.

Boston. Dec. 22.

[From our Special Correspondent.]

Here we are close upon Christmas. Every body is buying presents, and scarcely any one is buying coal. Retailers are having a little better trade, but it is not what they anticipated at this time. Nevertheless, the general situation has improved since our last. Jobbers and agents in this market are doing but a very moderate business, yet they are getting better prices. There is no mistake about this. The $3.90 Stove coal f.o.b. at New York has gone by, and $4 is the lowest figure we hear. This price is claimed to be as low as $3.90 was two weeks ago. The advance in Chestnut is also marked, and as high as $3.70 is asked. As for Pea, there is a quick market for any odd lot at $2.10@ $2.25 f.o.b. If we continue to have winter weather—

something a little colder, if you please—there is a prospect, judging from the aspect of affairs here, that the nominal f.o.b. price of $4.15 for Stove coal will become actual.

There is nothing to note in soft coal trade in the way of actual transactions; but as almost every one is inquiring whether any one else is doing any thing, a general air of suspicion is prevalent, and we are likely to wake up some morning and find a few choice contracts "out of the market." For such small cargo trade as comes along, we quote $2.30, f. o. b., at all ports and $3.75 delivered at this port.

There is considerable complaint about the scarcity of vessels, and freights have been advanced on this account. At Baltimore, where there are fewer vessels—in fact, scarcely any—than at other shipping ports, $1.25@$1.30 is paid, exclusive of discharging, while $1.25 is paid at Philadelphia. Regarding Philadelphia as a winter shipping port, we hear of a skipper who belts his vessel with thin plate-iron above and below the water-line. and he thereby defies the sharp cutting ice of the Schuykill River. The boycott of the Boston Tow-Boat Company, because that corporation runs a line of coal barges, amounts to nothing, as far as we can learn. This company has carried about 25,000 tons in barges this season, and expects to do much more next year. It claims to have obtained better rates than Luckenbach, of New York, or Morse Brothers, of Bath, Me., both of whom run coal barges. Its rates average, from New York to Boston, about $1 a ton, discharging included, or about ten cents less than the minimum vessel rates. The New York barge lines do towing in Boston harbor while waiting for discharge, and the Boston Company proposes to retaliate by doing such odd jobs of towing as can be picked up in New York while waiting for barges to be loaded.

We quote vessel rates, exclusive of discharging, as follows:

New York, 80@90c.; Philadelphia, $1.25; Baltimore, $1.25@$1.30; Newport News and Norfolk, $1.10@$1.15; Richmond, $1.15@$1.20; Cape Breton, $1.85@$2; Bay of Fundy, $1.60.

There is only a moderate retail movement. Prices are held at the advance last noted. We quote delivered prices as follows:

White ash, furnace	$5.00@$5.25
" egg	5 25@ 5 50
" stove and nut	5 50@ 5.75
Lehigh furnace, egg and stove	5.50@ 5.75
" nut	5.50@ 6.00
Shamokin egg	@ 6.00
" stove	6.00@ 6.25
Lorberry egg and stove	@ 6.50
Franklin egg and stove	7 00@ 7.50

Wharf prices, 50 to 75 cents a ton less.

Pittsburg. Dec. 22.

[From our Special Correspondent.]

Prices are steady. Since our last, there has been a further coal shipment. December exports, to Cincinnati, 2,291,000 bushels: to Louisville, 2,181,000; total, 4,472,000 bushels. So far, no loss has been reported, although the ice was very formidable. Prices range as follows: River, wholesale, f.o.b., 4¼@4¾@5c. per bushel; Railroad, 4½@5c.

Connellsville Coke.—Prices have been uniform for some time. Cars are reported less scarce, but not equal to the demand. Another strike is expected Saturday will decide. Blast-Furnace, $1.50, f.o.b. cars at ovens; Foundry, $1.75; Crushed, $2.25.

Here is the latest about the intended strike: A long and spirited meeting of the coke syndicate was held in the Lewis Block yesterday. John Jarrett was present, and presented the demands of the Miners' Amalgamated Association and the assemblies of the Knights of Labor. Mr. Jarrett made a strong plea for the majority of the demands made by the cokers. Mr. Jarrett's argument was heard courteously, but after a short conference among the members of the syndicate he was informed that there was no good reason why the resolutions adopted when the demands were first presented should be reconsidered, and that they could not be conceded now. The cokers have given the operators until Saturday to decide whether they will change their mind. The operators say their refusal is final, and profess to believe the workmen will not strike. The leaders of the latter say they will come out to a man, and that Saturday will witness the inauguration of the greatest strike in the history of the coke trade.

FINANCIAL.

Mining Stocks.

NEW YORK, Thursday Evening, Dec. 23.

The past week has been quiet in the mining market, with limited transactions and prices that have varied but little. The indications are, however, that the beginning of 1887 will witness a great revival of business in mining stocks. A number of new companies are about to be listed.

The stock of El Cristo Gold and Silver Mining Company, to which we referred extensively in last week's review, will no doubt soon play an important part at the Exchange. Telegraphic advices reporting improvement of mineral and the great value of the mine, etc., are beginning to prepare the way. Sales were made to the extent of 2000 shares, at prices ranging from $2.25@$2.90, closing at $2.75.

Consolidated California & Virginia is resting from its arduous labors in the recent boom; but 272 shares changed hands at from $20@$23.50; to-day, quotations are $22.25. The bullion shipments are reported to be increasing, and with this the hope of a dividend. Sierra Nevada advanced from $3.85@$5.50 on Wednesday, and declined to-day to $4. Savage showed one sale at $9.38; and Chollar, one at $4.60. Ophir was quiet and higher at from $10@$13. Hale & Norcross, at from $3@$3.85. Union Consolidated showed a higher movement, going from $2.90@$5.13. Mexican, from $4.95@$6.38. Ten shares of Best & Belcher sold to-day at $10. Sutro Tunnel again shows the largest transactions on the list; sales, 101,500 shares, at from 21@35c.

A few sales of Eureka were made at from $4.50@$5. Navajo showed no transactions until to-day, when a few were recorded at from 93c.@$1.

Colorado stocks were almost entirely neglected. Colorado Central was firm at from $2.75@3.05. Little Pittsburg, Leadville, and Little Chief were quiet, selling respectively at 65c., 55c., and 28c. Chrysolite was stationary at 60c. Robinson, at 45c. Lacrosse varied from 13@16c. Silver Cliff attracted considerable attention; on Saturday, it sold at 27c.; on Monday, advanced to 40c.; and declined again to 28c; closing to-day at from 35@30c. Amie's ghost appeared at 3c.; and that of Red Elephant at 4@5c.

No attention was given to the Bodie stocks. A few sales of Bodie Consolidated were made at from $2.50@$2.70; of Standard, at $1.35; of Mono, at $2.90; of Consolidated Pacific, at 34c.; and of Goodshaw, at 20c.

Quicksilver Preferred and Common held their own; the former at from $26.50@$27.50, and the latter at $7. The same may be said of Plymouth Consolidated, which remains at from $16.75@$16.88.

Ontario has declared its usual monthly dividend of $75,000, making a grand total to date of $7,925,000. A sale of the stock this week was made at $23.50. Horn-Silver was firm at from $1.50@$1.90. Stormont sold at from 12@14c.

It was rumored that Iron Hill would declare a dividend. The stock on Saturday sold at $1.75, and on Monday declined to $1 05. Homestake was lower at from $11.50@$10. It is said by those who are in a position to be well informed that the decline in this stock is simply an indication that a "see-saw" is worked in the usual Western style, the Homestake on one end and the Deadwood-Terra on the other. No sales have been made in Deadwood-Terra this week. Caledonia was quiet at from $1.20@$1.15. Father de Smet, at 70c.

Alice was active, with prices ranging from $1.50@$1.65, closing at $1.50.

Silver King was quoted at from $6.50@$6.75.

Much interest continues to be centered in Rappahannock, which advanced from 16@27c., the closing price to-day.

Castle Creek shows no signs of the promised "advance," and declined from 18@12c., closing at 14c. to-day.

The total transactions for the week were 210,617 shares, showing a decrease of 11,594 shares, compared with the preceding week.

Coal Stocks.

The stock market during the past week has been unsettled, with somewhat greater strength during the past two days. The business to-day has been very small, and but little improvement is expected as to quantity before the middle of next week. For some days past, money has been very easy. There is, nevertheless, a feeling that it will be stringent before the end of the week, and prominent commission houses say that the banks are already calling loans in a moderate way for the purpose of providing against the January disbursements. Thinking men are driven to conservatism by the political outlook in Europe. The impression is gaining ground that war can hardly be averted. Should war occur, it is thought that the first influence on this market would be injurious. Commission houses are advising their customers to keep out of the market until after January 1st.

The impression that the Reading property will have to be foreclosed is gaining ground.

There is some very bearish talk on Jersey Central; but, at the same time, there is said to be good buying.

Lackawanna will announce a dividend on the 31st inst.

Meetings.

The annual and special meetings of the following companies will be held at the times mentioned:

Cambria Iron Company, No. 218 South Fourth street, Philadelphia, Pa., January 18th, at four o'clock P.M.

Dividends.

Chicago & Indiana Coal Railroad Company will pay the coupons due January 1st, 1887, on its first mortgage 5 per cent bonds, on and after that date, at the Metropolitan Trust Company, No. 35 Wall street.

Morning Star Consolidated Mining Company, of Colorado, has declared dividend No. 27, of 25 cents a share, or $25,000, payable the 20th inst.

Ontario Silver Mining Company, of Utah, has declared dividend No. 127, of fifty cents a share, or $75,000, payable on the 31st inst., at Messrs. Lounsberry & Co.'s, No. 15 Broad street, New York City.

Small Hopes Consolidated Mining Company, of Colorado, has declared dividend No. 48, of fifty cents a share, or $100,000, payable on the 25th inst.

DIVIDENDS PAID BY MINING COMPANIES DURING THE MONTH OF NOVEMBER AND FROM JANUARY 1ST, 1886.

NAME OF COMPANY.	Location	Paid in November.	Since Jan. 1st.
Adams, S. L	Colo.	$22,500	$225,000
Alice, G. S	Mont.		75,000
Amy & Silversmith, S.	Mont.	34,142	170,750
Atlantic, C.	Mich.		40,000
Bellevue-Idaho, S. L.	Idaho	12,500	62,500
Big Bend Hydraulic, G.	Dak.	6,000	60.000
Boston & Montana, G. S.	Mont.		180.000
Brooklyn Lead, L.	Utah		20,000
Caledonia, G.	Dak.		20.000
Calumet & Hecla, C.	Mich.	500,000	1,500.000
Central, C.	Mich.		40 000
Colorado Central, S.	Col.		83.750
Cons. Cal. & Va., G. S.	Nev.		64,800
Crescent, G. S. L	Utah		30,000
Derbec Blue Grav., G.	Cal.		40,000
Elkhorn, G. S.	Mont.	5,000	55,000
Franklin, C.	Mich.		40,000
Freeland, G. S. C.	Colo		60.000
Granite Mt., S	Mont.		920,000
Hecla Con., G. S. L. C.	Mont	15,000	165 000
Helena Mg. & R., G. S. L. C	Mont.		59,670
Holmes, S	Nev		75,000
Homestake, G.	Dak.	50,000	550.000
Honorine, S. L.	Utah		12,500
Idaho, G	Cal.	15,500	170,500
Idahoan, S	Idaho.		92,000
Ideal, S. L.	Colo.		15,000
Iron Hill	Dak.		112,500
Iron Silver, S. L.	Colo.		200,000
Jackson, G. S.	Nev.		20,000
Leadville Cons., S. L.	Colo.		40,800
Manhattan, S	Nev.		25,000
Martin White, S.	Nev.		25,000
Mono, G.	Cal.		12,500
Montana, Lt., G.	Mont.		653,400
Morning Star, S. L	Colo.		100,000
Moulton, G. S.	Mont.		60,000
Ontario, S.	Utah	75,000	825,000
Paradise Valley, G. S.	Nev.		80,000
Peacock, G. S. C.	N. Mex.		60,000
Plumas-Eureka, G.	Cal.		52,729
Plutus, G. S. C.	Colo.		20,000
Plymouth Con., G	Cal.	25,000	275,000
Quicksilver Pref., Q.	Cal.		118,250
Quincy, C.	Mich.		240,000
Richmond, S. L	Nev.		67,500
Robinson Con., S.	Colo.		10,000
Sierra Buttes, C.	Cal		76,562
Silver King, S.	Ariz.		200,000
Silverton, S.	Colo.	4,000	44,000
Small Hopes Con., S. L.	Colo.	50,000	637,500
St. Joseph, L.	Mo		66,000
Valencia, M	N. H.		3,750
Viola, S. L.	Idaho.	42,500	42,500
Yankee Girl	Colo.	25,000	250,000
Young America, G.	Cal.		165,000
		$882,142	$9,308,661

G., Gold; S., Silver; L., Lead; C., Copper; Q., Quicksilver; M., Mica.

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par value	Assessments. Total levied to date.	Assessments. Date and amount per share of last.	Dividends. Total paid to date.	Dividends. Date and amount per share of last.		
1	Adams, s. L	Colo.	$1,500,000	150,000	$10	*		$540,000	Dec.	1886	15
2	Alice, s. C	Mont	10,000,000	400,000	25	*		750,000	Sept	1886	06⅛
3	Amie Con., s. L	Colo.	5,000,000	500,000	10	*		330,000	Oct	1883	.05
4	Amy & Silversmith, s.	Mon.		311,419				24,852	Dec	1886	.10
5	Atlantic, C	Mich	1,000,000	40,000	25	$280,000	Apl. 1875	320,000	Jan.	1886	$1.00
6	Argenta, s	Nev.	10,000,000	100,000	100	295,000	July 1885	40,000	Feb.	1880	.20
7	Barbee & Walker, s.	Utah	1,000,000	100,000	10	*		60,000	No	1880	10
8	Bassick, G. s	Colo.	10,000,000	100,000	100	*		400,000	Mar.	1884	1.00
9	Belle Isle, s	Nev.	10,000,000	100,000	100	140,000	May 1886	10	300,000	Dec	1879	25
10	Belcher, G. s	Nev.	10,400,000	104,000	100	2,217,335	ec 1885	30	15,397,000	Apl	1876	1.00
11	Bellevue Idaho, s. L	Idah.	1,250,000	125,000	10	26,250	Dec. 1884	10	150,000	Nov	1886	.10
12	Big B'nd Hydraulic, G	Dak.	1,000,000	200,000	5	*			210,000	Dec.	1886	.03
13	Black Bear, G	Cal.	3,000,000	30,000	100	22,500	Dec. 1884	.25	885,000	May	1883	.20
14	Bodie Con., G. s	Cal.	10,000,000	100,000	100	324,990	Jun. 1886	.50	1,602,572	Apl.	1885	.50
15	Bonanza Developm't	C & M	3,000,000	300,000	10	*			135,000	Oct.	1882	.15
16	Bonanza K'g, Cons. s.	Cal.	1,000,000	100,000	10	*			180,000	Feb	1885	.10
17	Boston & Mont. G	Mont	2,500,000	250,000	10	*			525,000	Jun	1886	.15
18	Breece, s	Colo.	5,000,000	200,000	25	*			2,000	Fe	1880	.01
19	Brookiyn Lead, L. s	Utah	500,000	50,000	10				102,000	Sept	1886	.05
20	Bulwer, G	Cal	1,000,000	100,000	100	40,000	Oct. 1885	20	175,000	Jan.	1884	.10
21	Caledonia, G	Dak	10,000,000	100,000	100	505,000	May 1885	.15	40,000	Feb.	1886	.10
22	Calumet & Hecla, C	Mich	2,500,000	100,000	25	1,200,000			28,350,000	Nov.	1886	5.00
23	Carbonate Hill, s. L	Colo.	2,000,000	200,000	10	*			80,000	Apl.	1884	.05
24	Caribou Con., s	Colo.	1,500,000	150,000	10	*			50,000	Mch	1880	.10
25	Castle Creek, G	Idah.	100,000	100,000	1				51,000	Oct.	1883	.03
26	Catalpa, s L	Colo.	3,000,000	300,000	10	*			270,000	May.	1884	.10
27	Central, C	Mich	500,000	20,000	25	100,000	Sept 1861	.06	1,780,000	Jan.	1886	2.00
28	Christy, s	Utah	10,000,000	100,000	100				10,000	Jun.	1885	.10
29	Chrysolite, s. L	Colo.	10,000,000	200,000	50	*			1,650,000	Dec.	1884	.25
30	Colorado Central, s. L	Colo.	2,750,000	275,000	10	*			171,250	Dec.	1886	.10
31	Cons. Cal. & Va., G. s.	Nev.	21,600,000	216,000	100	108,000	Jan. 1885	.20	64,800	Feb.	1886	.30
32	Con. Gold Mining, G	Ga	500,000	100,000	5	*			108,000	Nov.	1883	.02
33	Contention, s	Ariz.	12,500,000	250,000	50				2,587,000	Dec.	1884	.25
34	Crescent, s. L. G	Utah	15,000,000	600,000	25	‡			210,000	Aug.	1886	.05
35	Crown Point, G. s	Nev.	10,000,000	100,000	100	2,675,000	Feb. 1882	.25	11,588,000	Jan.	1875	2.00
36	Deadwood-Terra, G	Dak.	5,000,000	200,000	25	*			1000,000	Jan.	1883	.10
37	Derbec B. Grav., G. s.	Cal.	10,000,000	100,000	100				140,000	Jun.	1886	.10
38	Dunkin, s. L	Colo.	5,000,000	200,000	25	90,000	Dec. 1881	.10	220,000	Sept	1884	.05
39	Elchorn, G. s	Mont	1,000,000	100,000	10	*			150,000	Dec.	1886	.50
40	Eureka Con., G. s. L	Nev.	5,000,000	50,000	100	50,000	July 1883	.50	500,000	July	1886	1.00
41	Evening Star, s. L	Colo	500,000	50,000	10	*			1,400,000	Nov	1883	.50
42	Excelsior, G	Cal.	10,000,000	100,000	100	563,000	Sept 1885	1.00	875,000	Oct.	1880	.25
43	Father de Smet, G	Dak.	10,000,000	100,000	100	200,000	Nov. 1878	1.00	1,125,000	Dec.	1885	.20
44	Franklin, C	Mich	1,000,000	40,000	25	220,000	Jun. 1871		560,000	Dec.	1886	1.00
45	Freeland, G. s. C	Colo.	5,000,000	200,000	25	*			190,000	July	1886	.10
46	Fresno Enterprise, G	Cal.	5,000,000	100,000	50	*			110,000	July	1882	.10
47	Gould & Curry, G. s.	Nev.	10,800,000	108,000	100	4,055,000	Sept 1886	.50	3,826,000	Oct.	1870	10.00
48	Grand Central, s	Ariz.	1,000,000	100,000	10	*			625,000	Dec.	1882	.25
49	Grand Prize, s	Nev.	10,000,000	100,000	100	570, 0	Apl. 1886	.50	495,000	Mar.	1884	.25
50	Granite, s	Colo.	125,000	125,000	1				6,250	May	1883	.01
51	Granite Mountain, s.	Mont	10,000,000	400,000	25				1,600,000	Nov.	1886	.25
52	Green Mountain, G	Cal.	1,250,000	125,000	10	*			212,000	Nov.	1881	.07½
53	Hale & Norcross, G. s	Nev.	11,200,000	112,000	100	4,974,80	Oct. 1886	.40	1,598,000	Apl	1871	5.00
54	Hall-Anderson, G	N. S.	150,000	150,000	1				7,000	Jan.	1882	05
55	Hecla Con., s. G. L. C	Mont	1,500,000	30,000	50				1,107,000	Dec	1886	.50
56	Hel'a Mg & Red, G. s. L	Mont	3,315,000	663,000	5	*			197,970	July	1886	.06
57	Holmes, s	Nev.	10,000,000	100,000	100	300,000	Sept 1885	10	75,000	Apl.	1886	.25
58	Holyoke, G	Idah.	200,000	200,000	1				27,000	Feb.	1883	.10
59	Homestake, G	Dak.	12,500,000	125,000	100	200,000	July 1878	1.00	3,693,750	Dec.	1886	.20
60	Honorine, s. L	Utah	500,000	250,000	2	25,000	Jun. 1883		87,500	Dec.	1886	.05
61	Hope, s	Mont	400,000	8,000	50	*			158,252	Oct.	1884	1.50
62	Horn-Silver, s. L	Utah	10,000,000	400,000	25	*			4,000,000	Nov.	1884	.50
63	Idaho, G	Cal.	310,000	3,100	100				3,750,000	Jun.	1886	7.50
64	Ideal, s L	Colo.	1,500,000	150,000	10				15,000	Oct.	1886	.05
65	Independence, s	Nev.	10,000,000	100,000	100	340,000	Oct. 1886	.20	225,000	Sept	1879	.25
66	Indian Queen, s	Nev.	250,000	125,000	2				368,750	July	1883	03
67	Inyo, G	Cal.	500,000	100,000	5	*			45,000	Apl.	1882	.05
68	Iron Hill, s	Dak.	2,500,000	250,000	0	82,500	Oct. 1885		112,500	Oct.	1886	.05
69	Iron-Silver, s. L	Colo.	10,000,000	500,000	50	*			1,800,000	Dec.	1886	20
70	Jackson, G. s	Nev.	5,000,000	50,000	100	10,000	Nov. 1880	.20	45,000	Oct.	1886	10
71	Jocuistita, s	Mex.	2,500,000	250,000	10				1,200,000	Feb.	1885	.50
72	Kentuck	Nev.	3,000,000	30,000	100	342,000	Nov 1881	.30	610,000	Sept	1882	.30
73	La Plata, s. L	Colo	2,000,000	200,000	10	*			410,000	Oct.	1886	.05
74	Leadville Cons., s. L	Colo.	4,000,000	400,000	10	*			565,000	Jan.	1885	2.00
75	Lexington, G. s	Mont	4,000,000	40,000	100	*			780,000	Mch	1885	.10
76	Little Chief, s. L	Colo.	10,000,000	200,000	50	*			1,050,000	Mch.	1880	.50
77	Little Pittsburg, s. L	Colo.	20,000,000	200,000	100	*			437,500	Feb	1886	.25
78	Manhattan, s	Nev.	5,000,000	50,000	100	150,000	July 1872	1.00	18,750	Oct.	1882	.25
79	Marguerite, G	Cal.	500,000	25,000	20				15,000	Jan.	1886	
80	Marion Bullion, G	N.C	500,000						115,000	Oct.	1886	25
81	Martin White, s	Nev.	10,000,000	100,000	100	1,150,000	Mar. 1886	25	1,826,000	Mar	1876	
82	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl. 1886	1 00	135,000	Oct.	1882	.15
83	Mono, G	Colo.	5,000,000	5,000	100	56,000	Jun. 1885	.50	180,000	Feb	1885	.10
84	Montana, Lt., G. s.	Mont	3,300,000	330,000	10	*			525,000	Jun	1886	.15
85	Morning Star, s. L	Colo.	1,000,000	100,000	10				2,000	Fe	1880	.01
86	Moulton, s. G	Mont	2,000,000	400,000	5	*			102,000	Sept	1886	.05
87	Mount Pleasant, G	Cal.	150,000	150,000	1	*			675,000	Dec.	1886	.25
88	Mt. Diablo, s	Nev.	5,000,000	50,000	100	137,500	Jun. 1880	2.00	320,000	Dec	1886	.07½
89	Napa, G	Cal.	700,000	100,000	7				105,000	Mar.	1884	.10
90	Navajo, G. s	Nev.	10,000,000	100,000	100	395,000	Mar. 1886	.25	325,000	Feb.	1885	.25
91	N. Hoover Hill, G. s.	N. C.	300,000	120,000	2½	*			30,000	Dec.	1885	.06⅛
92	New York Hill, G	Cal.	5,000,000	50,000	100	62,500	Oct 1885	.15	215,000	Aug.	1882	.10
93	Northern Belle, s	Nev.	5,000,000	50,000	100	425,000	Jan. 1884	8.30	2,400,000	Apl.	1883	50
94	North Belle Isle, s.	Nev.	10,000,000	100,000	100	150,000	Mar 1886	.20	30,000	Aug.	1881	.15
95	Ontario, s. L	Utah	15,000,000	150,000	100				7,925,000	Dec.	1886	.50
96	Ophir, G. s	Nev.	10,000,000	100,000	100	4,007,800	Dec 1886	.50	1,595,000	July	1882	1.00
97	Original, s. C	Mont	1,500,000	60,000	25	*			114,000	Oct.	1884	.05
98	Osceola, C	Mich	1,250,000	50,000	25	480,000	Apl. 1876	1.60	972,500	Sept.	1884	25
99	Oxford, G	N. S.	125,000	125,000	1	*			34,500	Oct.	1885	.02
100	Paradise Valley, G. s	Nev.	10,000,000	100,000	100	47,000	Mar. 1882	.15	140,000	Nov.	1886	.10
101	Peacock, s G C	N.M.	2,000,000	230,000	10	*			60,000	Nov.	1886	
102	Pleasant Valley, G. s.	Cal.	10,000,000	100,000	100	40,000	Mar. 1884	.10	30,000	Dec.	1882	.05
103	Plutus, G. s C. L	Colo.	2,000,000	200,000	10	*			230,000	Feb.	1886	.10
104	Plymouth Con., G	Cal.	5,000,000	100,000	50	*			1,850,000	Jan.	1887	.25
105	Prussian, s. L	Colo	1,500,000	150,000	10	*			132,000	Jan	1885	.10
106	Quicksilver, pref., Q	Cal.	4,300,000	43,000	100				785,150	Aug.	1886	1.25
107	" com., Q	Cal	5,700,000	57,000	100				151,000	July	1882	.40
108	Quincy, C	Mich	1,000,000	40,000	25	200,000	Dec. 1862		4,410,000	July	1885	2.00
109	Richmond, s. L	Nev.	1,350,000	54,000	25	*			4,245,087	Dec	1886	1.25
110	Ridge, C	Mich.	500,000	20,000	25	220,000	Mar 1886	.50	100,000	Feb	1880	.50
111	Rising Sun, s	Dak.	750,000	150,000	5	*			52,000	May	1881	.07½
112	Robinson Con., s. L	Colo.	10,000,000	200,000	50	*			585,000	Mar.	1886	.05
113	Robert E. Lee, s. L	Colo	10,000,000	500,000	20	*			100,000	Dec.	1882	.10
114	Rooks, G	Vt.	500,000	50,000	10	*			61,000	Apr	1885	.30
115	San Francisco, C	Cal.	5,000,000	50,000	100	45,000	Sept 188	.50	20,000	Feb.	1884	.05
116	Savage, s	Nev.	11,200,000	112,000	100	6,156,000	Jun. 1886	.50	4,460,000	July	1859	3.00
117	Security L. Mg, Mfg.	Colo.	1,000,000	100,000	10	*			50,000	July	1884	
118	Shoshone, G	Idah	150,000	150,000	1				7,500	Apl.	1883	.01
119	Sierra Buttes, G	Cal.	225,000	22,500	10				1,438,964	ct.	1886	.37
120	Sierra Grande, s	N. M.	2,500,000	500,000	5				860,000	Sept	1884	.25
121	Sierra Nevada, G. s.	Nev.	10,000,000	100,000	100	5,972,698	Sept 1886	.25	102,000	Jan.	1871	1.00
122	Silver Cord, G. s. L.	Colo.	5,000,000	500,000	10				225,000	Nov.	1883	.25
123	Silver King, s	Ariz.	10,000,000	100,000	100				1,775,000	Dec.	1886	.25
124	Silverton, G. s. L	Colo.	2,000,000	200,000	10	*			70,000	Nov.	1886	.02
125	Small Hopes Cons., s.	Colo.	5,000,000	250,000	20	*			2,512,500	Dec.	1886	20
126	Smuggler, s. L	Colo.	600,000	60,000	10				66,700	Aug.	1883	.25
127	Socorro, C	N. M.	250,000	5,000	100				4,000	Mch	1882	.00¾
128	South Yuba, G	Cal.	2,000,000	40,000	50	*			150,000	Oct.	1881	.75
129	Spring Valley, G	Cal.	200,000	2,000	1	50,000	Oct. 1886	.25	50,000	Jan.	1881	.25
130	Standard, G. s	Cal.	10,000,000	100,000	100	25,000	Oct. 1884	.25	4,425,000	Mar.	1884	.25
131	Stormont, s	Utah	500,000	100,000	1	*			155,000	Nov.	1881	.05
132	St. Joseph, L	Mo.	1,500,000	150,000	10	*			724,000	Dec.	1886	.20
133	Syndicate, G	Cal.	10,000,000	100,000	100	38,729	July 1882	.15	48,308	Sept	1885	.10
134	Tip Top, s	Ariz	10,000,000	100,000	100	250,000	Sept 1883	.25	100,000	Nov.	1881	.20
135	Tombstone, G. s. L	Ariz	12,500,000	500,000	25	*			1,250,000	Apl.	1882	.10
136	True Fissure, G. s. L	Utah	1,500,000	150,000	10	*			75,000	Jun.	1883	.15
137	United Verde, C	Ariz	3,000,000	300,000	10	*			97,500	Feb.	1884	.20
138	Valencia, M	N. M.	150,000	1,500	100	*			41,250	Apl	1886	2.50
139	Viola Lt., s. L	Idah.	750,000	150,000	5	*			37,000	Nov.	1886	.25
140	Vizina, s	Ariz.	5,000,000	200,000	25	*			140,000	Apl.	1882	.10
141	Yankee Girl	Colo.	2,500,000	250,000	10				1,062,500	Oct.	1886	10
142	Yellow Jacket, G. s.	Nev.	12,000,000	12,000	100	5,448,000	Dec. 1885	.75	2,184,000	Aug.	1871	1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par Value	Assessments. Total levied to date.	Assessments. Date and amount per share of last		
1	Agassiz Cons., s. L.	Colo.	$2,500,000	50,000	$50	*			
2	Albion, s. L	Nev.	15,000,000	150,000	100	$577,000	July	1883	.50
3	Allouez, C	Mich	2,000,000	80,000	25	240,000	Feb.	1884	.50
4	Alpha Con., G. s.	Nev.	3,000,000	30,000	100	430,000	Mar	1886	.50
5	Alta, s	Nev.	10,080,000	100,800	100	1,976,600	Oct.	1886	.25
6	American Flag, s	Colo.	1,250,000	125,000	10	300,000	Jun.	1877	.25
7	Anglo-Montana, Lt.	Mon.	600,000	120,000	5				
8	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5				
9	Aspen Mg. & S, s L	Colo.	2,000,000	200,000	10				
10	Barcelona, G	Nev.	5,000,000	200,000	25	*			
11	Battle Creek, G	Dak.	5,000,000	200,000	25				
12	Bear Creek	Cal.	300,000	300,000	1				
13	Bechtel Con., G	Cal.	10,000,000	100,000	100	173,500	Jan	1883	.10
14	Belmont, s	Nev.	5,000,000	50,000	100	735,000	Apl.	1886	.10
15	Best & Belcher, G. s	Nev.	10,080,000	100,800	100	1,748,590	Sept	1886	.50
16	Big Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*			
17	Bi-Metallic, s	Mon	5,000,000	200,000	25	*			
18	Black Jack, G	Cal.	250,000	100,000	2½	*			
19	Bonanza Chief	Mon	1,000,000	1,000,000	1	*			
20	Bondholder	Colo	500,000	200,000	2½				
21	Boston Con., G	Cal.	10,000,000	100,000	100	170,000	Nov	1883	.25
22	Bradshaw, G	Ariz	2,250,000	225,000	10				
23	Buckeye Common	Colo.	2,000,000	400,000	5	*			
24	Bull Domingo, s. L.	Colo.	10,000,000	200,000	50	*			
25	Bullion, G. s	Nev	10,000,000	100,000	100	4,600,000	Aug	1885	.30
26	Bve and Bye	Ariz.	1,000,000	100,000	10	*			
27	Calaveras, G	Cal.	500,000	500,000	1	*			
28	Catskill, s	Nev.	1,500,000	300,000	5				
29	Cen Contin'l, G. s L	C. & A	2,000,000	200,000	10	*			
30	Charles Dickens	Idan.	1,250,000	250,000	5				
31	Cherokee, G	Cal.	1,500,000	150,000	10				
32	Chollar, s	Nev.	11,200,000	112,000	100	1,696,000	Nov	1886	.50
33	Cinnamon Mt., G. s	Colo.	750,000	150,000	5				
34	Climax, s. L	Colo.	2,000,000	200,000	10	*			
35	Colorado No. 2, s L	Colo.	100,000	10,000	10				
36	Con. Imperial, G. s.	Nev.,	50,000,000	500,000	100	1,100,000	Aug.	1886	10
37	Con. Pacific, G	Cal.	6,000,000	60,000	100	174,000	Feb.	1886	.15
38	Cons Silver, s	Mo.	2,500,000	250,000	10				
39	**Con. Queen Cons, C.	Ariz	1,400,000	140,000	10				
40	Courtlandt	Colo.	500,000	50,000	10				
41	Crescent, s. L	Colo.	3,000,000	300,000	10				
42	Crocker, s	Ariz.	10,000,000	100,000	100	65,000	May	1886	.20
43	Crowell, G	N. C	500,000	500,000	1				
44	Dahlonega, G	Ga.	250,000	250,000	1	*			
45	Dandy, s	Colo.	5,000,000	500,000	10				
46	Dardanelles, G	Cal.	1,000,000	100,000	10				
47	Decatur, s	Colo.	1,500,000	300,000	5	*			
48	Denver City, s L	Colo.	5,000,000	500,000	10	*			
49	Denver Gold	Colo.	300,000	60,000	5				
50	Deseret, G s	Utah	500,000	50,000	10	*			
51	Dunderberg, s	Colo	1,500,000	150,000	10	*			
52	Durango, G	Colo.	500,000	500,000	1	*			
53	Durango T	Mex	120,000	1,200	100				
54	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886	1.60
55	Empire Lt., G	Mon.	500,000	100,000	5				
56	Empire, s	Utah	10,000,000	100,000	100				
57	Enterprise, s. L	Colo.	800,000	80,000	10	*			
58	Eureka Tunnel, s. L	Nev.	10,000,000	100,000	100	*			
59	Exchequer	Nev	10,000,000	100,000	100	860,000	Oct.	1886	.20
60	Garfield, Lt., G. s	Nev.	500,000	100,000	5				
61	Gold Placer, G	Colo.	5,000,000	200,000	25				
62	Goodshaw, G	Cal.	10,000,000	100,000	100	229,314	Dec.	1885	.25
63	Grand Belt, C	Tex.	12,000,000	120,000	100	*			
64	Grand Duke	Colo	800,000	80,000	10				
65	Gregory-Bobtail, G	Colo.	550,000	550,000	1	*			
66	Gregory Con., G	Mon.	3,000,000	300,000	10	*			
67	Hariem M. & M. Co, G.	Cal.	1,000,000	200,000	5				
68	Head Cent. & Tr. s. G	Ariz.	10,000,000	100,000	100				
69	Hidalgo, s	Mex.	200,000	20,000	10				
70	Highland, C	Mich	500,000	25,000	25				
71	Hortense, s	Colo.	2,000,000	200,000	10				
72	Iron Gold & Silver, s	N. M.	2,000,000	200,000	10				
73	Iroquois, C	Mich	1,250,000	50,000	25				
74	J. D. Reymert	Ariz	10,000,000	100,000	100	*			
75	Julia Cons., G. s	Nev.	11,000,000	110,000	100	1,438,000	Nov	1886	.10
76	Kearsarge, C	Mich	1,250,000	50,000	25	100,000	Apl.	1886	5.00
77	Laclede	N. M.	2,000,000	200,000	10				
78	Lacrosse, G	Colo.	1,000,000	100,000	10	*			
79	Lee Basin, s L	Colo.	5,000,000	500,000	10	*			
80	Leviathan, s	Nev.	10,000,000	100,000	100	380,000	Sept	1886	.25
81	Lucerne, s	Colo.	5,000,000	500,000	10	*	Jan	1886	.10
82	Mammoth Bar., G	Cal.	10,000,000	100,000	100	50,000	Dec	1884	
83	Mariposa pref., G	Cal.	5,000,000	50,000	100	1,687,500	Feb	1883	.25
84	" common, G	Cal.	10,000,000	100,000	100	1,975,000	Dec	1881	.20
85	May Belle, G	Cal.	10,000,000	100,000	100	84,000	Mar	1884	.15
86	Mayflower Gravel	Cal.	1,000,000	100,000	100	110,000	Nov	1886	.25
87	Mexican, G. s	Nev	10,000,000	100,800	100	2,565,760	Jun.	1886	.25
88	Mine & Starr, s. L	Colo.	1,000,000	200,000	5	*			
89	Miner Boy, G. s. L	Colo.	5,000,000	500,000	10	*			
90	Miller	Nev	5,000,000	200,000	25				
91	Moose Silver, s	Colo.	3,000,000	300,000	10	*			
92	Nachoochee, Lt., G	Ga.	1,000,000	200,000	5				
93	New Pittsburg, s. L	Colo	2,000,000	200,000	10	*			
94	North Standard, G	Cal.	10,000,000	100,000	100	20,000	Nov		
95	Noonday	Cal.	600,000	60,000	10	208,000	Dec	1881	.10
96	Old Dominion, C	Ariz.	3,000,000	300,000	10				
97	Oriental	Nev	2,000,000	200,000	10				
98	Oriental & Miller, s	Nev.	10,000,000	400,000	25				
99	Overman, G. s	Nev.	11,520,000	115,200	100	3,702,320	July	1886	.15
100	Parrott, G	Mon.	1,800,000	180,000	10				
101	Park, s	Utan	2,000,000	200,000	10				
102	Peer, s	Ariz.	10,000,000	100,000	100	135,000	Nov.	1886	.10
103	Peerless, s	Ariz.	10,000,000	100,000	100	295,000	Nov.	1886	.20
104	Potosi	Nev.	11,200,000	112,000	100	1,112,000	Nov	1886	.30
105	Puritan, s. G	Colo	1,500,000	150,000	10	*			
106	Quin y	Colo.	3,000,000	300,000	10				
107	Rappahannock, G. s	Va	250,000	250,000	1	*			
108	Red Elephant, s	Colo	500,000	500,000	1	*			
109	Robbins, G. s	Colo.	5,000,000	200,000	25	*			
110	Ropes, G. s	Mich	2,000,000	80,000	25	63,200	Mar	1886	.10
111	S.P. & Canon del A. C.	N.M.	10,000,000	400,000	25	*			
112	Sheridan	N. M.	2,000,000	200,000	10				
113	Silver Cliff, s	Colo.	5,000,000	400,000	12½				
114	Sonora Con	Mex.	5,000,000	200,000	25	*			
115	South Bulwer, G	Cal.	10,000,000	100,000	100	100,000	May	1881	.25
116	South Hite	Cal.	10,000,000	100,000	100	195,000	Jan.	1883	.05
117	South Pacific	Cal.	500,000	100,000	5				
118	State Line, s	Nev.	250,000	250,000	1				
119	St. Louis & Mex., s.	Mex.	5,000,000	500,000	10	*			
120	St Louis & St Elmo	Colo.	2,000,000	200,000	10				
121	St. L & St. Felipe, G s.	Mex.	1,500,000	150,000	10				
122	St L & Sonora, G. s.	Mex.	1,500,000	150,000	10				
123	St. Lou's & Yavapai.	Ariz.	3,000,000	300,000	10				
124	Sunday Lake, I	Mich	1,250,000	50,000	25				
125	Sullivan, G. s. L	Me	500,000	100,000	5	125,00	Dec.	1882	.25
126	Sutro Tunnel	Nev.	20,000,000	2,000,000	10	*			
127	Tamarack, C	Mich.	1,000,000	40,000	25	520,000	Apl.	1886	3.00
128	Taylor-Plumas, G	Cal.	1,000,000	200,000	5	*			
129	Tioga Cons., G	Cal.	10,000,000	100,000	10	*			
130	Todos Santos, s	Mex.	1,000,000	100,000	100	325,000	Oct.	1886	.10
131	Tuscarora, s	Nev.	10,000,000	100,000	1 0	110,00	Oct.	1881	.15
132	Unadilla, s	Colo.	50,000,000

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Dec. 18.		Dec. 20.		Dec. 21.		Dec. 22.		Dec. 23.		Dec. 24.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon	1.50	.....	1.65	1.55	1.65	1 60	1.55	.....	1.50	.....	.....	.....	2,550
Amie Con., Co	.03	.....	.03	.....	.....	.. ..	.. ..	.....	.3	.....	.....	.....	8,800
Argenta, Ne	.....	.....	.. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bassick, Co	.18	.....	.....	... ..	... ..	.....	.....	.....	.14	... .	.....	.....	1,000
Belle Isle, Ne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bodie Cons., Ca	2.75	.....	2.70	2 50	.....	.....	2.70	.....	.....	.....	.....	.....	470
Bulwer, Ca	.....	.....	.. ..	.....	.....	.....	.....	.....	1.50	.....	.....	.....	200
Caledonia	1.20	.....	.....	.....	1.15	.....	.....	.....	.....	.....	.....	.....	300
Cal. Pacific	.....	.....	.....	.....	.....	.....	9.75	.....	.....	.....	.....	.....	75
Chollar	.....	.....	.....	.....	4.60	.....	.....	.....	.....	.....	.....	.....	200
Carysolite, Co	.....	.....	60	.....	.....	.....	.60	.....	.60	.....	.....	.....	1,200
Colorado Central	2.75	.....	.....	.....	2.90	.....	3.05	3.00	.....	.....	.....	.....	620
Cons. Cal. & Va., Ne	.....	.....	.....	.....	23 50	20.00	.....	.....	22.25	.. ..	.....	.....	272
Deadwood	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunkin	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
El Cristo	2.75	2.50	.....	.....	2.25	.....	2.90	2.35	2.75	.....	.....	.....	2,000
Eureka Cons., Ne	.....	.. ..	5.00	4.50	.....	... ..	.....	.....	.....	.....	.....	.....	110
Gartner de Smet, Dk	.. ..	.....	.....	.....	.70	... ..	.....	.....	.....	.....	.....	.....	400
Freeland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Stripe, Ca	.04	.....	.....	.....	.....	.....	.....	.....	.06	.....	.....	.....	2,700
Gould & Curry, Ne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green Mountain, Ca	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hale & Norcross, Ne	.....	. ...	3.10	3.00	.....	.....	.....	.....	3.85	.....	.....	.....	250
Hibernia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Homestake, Dk	11.50	.....	.....	.....	11 50	11.00	.....	.....	10.00	.....	.....	.....	520
Horn-Silver, Ut	.....	.....	1.85	1.75	... ..	.....	1.70	1.50	1.90	1.75	.....	.....	1,100
Independence	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Hill	1.75	... ..	1.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	300
Iroa Silver, Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Leadville C., Co	.....	.....	.....	.....	.54	.....	.55	.....	.....	.....	.....	.....	400
Little Chief, Co	.....	.....	.....	.....	.....	.....	.28	.....	.....	.....	.....	.....	500
Little Pittsburg, Co	.....	.....	.65	.....	.....	.....	.....	.....	.....	.....	.....	.....	500
Martin White, Ne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Navajo, Ne	.....	.....	.....	.....	.....	.....	.....	.....	1.00	.93	.....	.....	300
North Belle Isle, Ne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario, Ut	.....	.....	10.00	.....	13.00	.....	23.50	.....	.....	.....	.....	.....	40
Ophir	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
Plymouth	.....	.....	.....	.....	.....	.....	.....	.....	16.88	16.75	.....	.....	40
Quicksilver Pref., Ca	.....	.....	26 50	26.25	27.50	27.00	.....	.....	27.50	.....	.....	.....	800
" Com., Ca	.....	.....	.....	.....	7.00	.....	.....	.....	.....	.....	.....	.....	200
Quincy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Robinson Cons., Co	.45	.....	.....	.....	9.38	.....	.....	.....	.....	.....	.....	.....	100
Savage, Ne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Scorpion	.....	.....	.....	.....	.....	.....	1.25	.....	.....	.....	.....	.....	100
Sierra Nevada, Ne	.....	.....	3.85	.....	5.00	4.60	5.50	.....	4.50	4.00	.....	.....	900
Silver King, Ar	6.50	.....	.....	.....	6.75	6.50	.....	.....	.....	.....	.....	.....	500
Spring Valley, Ca	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard, Ca	.....	.....	1.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	300
Stormont, Ut	.14	.12	.12	.....	.....	.....	.13	.....	.13	.....	.....	.....	6,700
Tip Top, Ar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Jacket	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Dec 18.		Dec. 20.		Dec. 21.		Dec. 22.		Dec. 23.		Dec. 24.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alta	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
American Flag	.....	.....	.....	.....	.....	.....	.18	.16	.....	.....	.....	.....	1,500
Barcelona, G	.....	.....	.....	.....	.12	.11	.....	.....	.....	.....	.....	.....	1,600
Bechtel Con., G	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belvidere	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belcher	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Best & B'lcher, G. S	.....	.....	.....	.....	.....	.....	.....	.....	9.25	.....	.....	.....	10
Big Pittsburg, S. L	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bullion	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bradshaw	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buil-Domingo, S.L.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Castle Creek	18	.12	.....	.....	.....	.....	.18	.12	.14	.....	.....	.....	2,700
Central Ariz'na, S	.....	.....	.....	.....	.....	.....	13	.....	.....	.....	.....	.....	100
Columbia & Beaver	.03	.02	.....	.....	.02	.....	.03	.02	.03	.....	.....	.....	13,500
Cons. Imperial	.....	.....	.....	.....	.....	.....	.....	.....	1.00	.....	.....	.....	200
Con. Pacific	.....	.....	.....	.....	.....	.....	.....	.....	.34	.....	.....	.....	100
Dahlonega	.....	.....	.....	.....	.....	.....	.02	.....	.02	.....	.....	.....	3,300
Decatur	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Durango, G	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,000
Eastern Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goodshaw, G	.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Harlem M. & M. Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Helena	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kossuth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacrosse, G	.....	.....	.....	.....	.15	.13	.16	.15	.....	.....	.....	.....	10,200
Mariposa Pref., G	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Com., G	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, G. S	4.95	.....	5.25	.....	6 38	5.50	.....	.....	.....	.....	.....	.....	800
Mono	2.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500
Navajo, 2 and 3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Pittsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Standard, G	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Horn-Silv'r, S L	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ori'nt'l & Miller, S	.....	...	.15	.....	.....	.....	.18	.17	.....	.....	.....	.....	1,600
Potosi	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rappahannock, G	.19	.16	.19	.18	.19	.....	.20	.18	.27	.....	.....	.....	17,400
Red Elephant, S	.05	.....	.04	.....	.05	.....	.05	.....	.05	.....	.....	.....	4,500
" 2 and 3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Cliff, S	.30	.27	.40	.33	.26	.28	.36	.34	.35	30	.....	.....	13,350
Sonora Con	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Bodie, G	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Bulwer, G	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Pacific	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
State Line, 1 & 4, S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Nos. 2 & 3, S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sutro Tunnel	.27	.21	.25	.24	.31	.25	.35	.29	30	.26	.....	.....	101,500
Taylor Plumas	.....	.. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tioga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unadilla, S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Cons., G. S	3.25	2.90	3.00	.....	.....	.....	5.13	4.00	.....	.....	.....	.....	910
Utah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

BOSTON MINING STOCK QUOTATIONS.

	Dec. 17.		Dec. 18.		Dec. 20.		Dec. 21.		Dec. 22.		Dec. 23.		SALES.
Amie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Allouez	2 06	.....	2 00	.....	2.25	2.00	.....	.....	.....	.....	.....	.....	650
Atlantic	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belle Isle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bodie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bonanza D	.....	.....	1.50	.....	1.75	.....	1.87	.....	.....	.....	.....	.....	400
Boston & Montana	.....	.....	.....	.....	.....	.....	5.00	.....	.....	.....	.....	.....	200
Breece	.....	.....	.35	.....	.....	.....	.35	.....	.....	.....	.....	.....	300
Bulwer	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Calumet & Hecla	213¾	... ..	215	.....	216	215	216	215	215	... .	.....	.... .	83
Catalpa	.35	.....	.....	.....	90	.....	.35	.....	.35	.....	.....	.....	600
Central	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Virginia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunkin	.....	.....	.....	.....	.38	.....	.....	.....	.38	.....	.....	.....	700
Eureka	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin	... ..	... ..	.. ..	.....	14.00	13.75	.....	.....	.....	.....	.....	.....	245
Freeland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Prize	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Honorine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kearsage	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Osceola	26 50	26.00	26.25	.....	26.00	25.00	26.00	.....	.....	.....	.....	.....	289
Quincy	55.00	.....	56.00	.....	56.00	55.00	56.00	55.00	.....	.....	.....	.....	95
Robinson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Security	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stormont	.....	.....	.18	.....	.14	.....	.....	.....	.....	.....	.....	.....	200

	Dec. 17.		Dec. 18.		Dec. 20.		Dec. 21.		Dec. 22.		Dec. 23.		SALES.
Arnold	.....	.....	.....	.....	.....	.....	.....	.....	.50	.....	.....	.....	100
Aztec	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bijou	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	125
Blue Ridge	.27	.26	.....	.....	.27	.....	.27	.....	.24	...	.....	.....	1,100
Bowman Silver	.....	.....	.06	.05	.....	. ..	.06	.....	.....	.....	.....	.....	1,600
Cedar Spring	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Pacific	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Copper Falls	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crescent	.....	.....	.....	.....	.....	.....	.14	.13	.13	.. ..	.....	.....	500
"Cusi"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Durango	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Humboldt	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hungarian	.....	.....	.....	.....	.....	.....	.....	.....	.20	.....	.....	.....	100
Huron	3.12	.....	3.12	.....	2.87	.....	2.87	.....	.....	.....	.....	.....	500
Mascot	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mesnard	.....	.....	.....	.....	.....	.....	.....	.....	.40	.....	.....	.....	100
Minnesota	.....	.....	2.00	.....	.....	.....	.....	.....	2.00	.....	.....	.....	200
National	1.00	.....	1.50	.....	.....	.....	.....	.....	1.30	.....	.....	.....	315
Native	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Napa	.....	.....	1.15	.....	.....	.....	.....	.....	1 12	.....	.....	.....	700
Oriental & Miller	.19	.....	.....	.....	.....	.....	.....	.....	.19	.....	.....	.....	200
South Side	.....	.....	.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	600
St. Mary's	.....	.....	.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Sutro Tunnel	.....	.....	.....	.....	.....	.....	.....	.....	.31	.....	.....	.....	200
Tamarack	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ute	.....	.....	.....	.....	.....	.....	.94¼	.....	.....	.....	.....	.....	100
Washington	.....	.....	.....	.....	.....	.....	.10	.....	.....	.....	.....	.....	100

New York: Dividend shares sold, 37,747. Non-dividend shares sold, 175,870. Total New York, 213,617.
Boston: Dividend shares sold, 3,762. Non-dividend shares sold, 6,640. Total Boston, 10,402.

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Dec. 18.		Dec. 20.		Dec. 21.		Dec. 22.		Dec. 23.		Dec. 24.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Parclay Coal	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cameron Coal	50	33¼	31¾	33¼	33	33⅞	33	35⅞	34	37⅛	36½	.....	.....	8,297
Col., C. & I	10	36	35¾	36	34½	35½	34	36¼	35¾	37¾	36½	.....	.....	7,073
Ches. & O. RR	100	9	.....	9	.....	9	....	8½	.....	.....	.....	.....	.....	660
Consol. Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumb. C. & I	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Del. & H. C	100	102	101⅜	101⅞	100	101½	100	.....	.....	103½	101½	.....	.....	6,714
D., L. & W. RR	50	135¾	133½	134½	132¾	133¾	131⅛	134½	133¼	134⅝	133½	.....	.....	195,655
Elk Lick Coal Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lehigh C. & N.†	50	49¼	.....	49½	49⅜	49½	49	49½	.....	.....	.....	.....	.....	1,008
Lehigh Valley RR.†	50	56⅜	.....	56	.....	56	....	56	.....	.....	.....	.....	.....	364
L. & W. C. & I. Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montauk Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morris & Essex	50	.....	.....	.....	.....	140¼	.....	.....	.....	.....	.....	.....	.....	14
New Central Coal	100	.....	.....	.....	.....	.....	.....	15	.....	.....	.....	.....	.....	300
N. J. C. RR	100	52	51⅛	51⅜	50⅜	51⅜	49¾	51⅝	49¾	51	48⅝	.....	.....	65,270
N. Y. & S. Coal	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Penn. Coal	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Penn. RR.†	50	56½	56⅜	56¼	55⅞	56½	55¼	56⅛	55¾	.....	.....	.....	.....	6,129
Ph. & R. RR.*	50	36⅝	35⅝	34⅞	3.¾	34⅛	30¼	34⅝	33	34	32½	.....	.....	413,351
Spring Mountain	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tennessee C. & I. Co	.....	78¼	74	76	72½	73½	65	74	71	47½	43	.....	.....	9,050
Westmoreland Coal†	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Of the sales of this stock, 63,159 were in Philadelphia, and 350,192 in New York.
† The quotations for these stocks are not percentage, but actual price.

Total sales, 713,885.

Pipe Line Certificates.

Messrs. Watson & Gibson, brokers, No. 49 Broadway, report as follows for the week:

The petroleum market this week has been very quiet and featureless. The situation in the field remains unchanged, and the outlook for an increased production is not good. Consumption at present exceeds production, stocks of oil in Europe are light, and the demand for refined is good, both at home and abroad. Notwithstanding the bullish situation, prices "hang

San Francisco Mining Stock Quotations.

NAME OF COMPANY.	CLOSING QUOTATIONS. Dec. 17.	Dec. 18.	Dec. 20.	Dec. 21.	Dec. 22.	Dec. 23.
Albion	.....	.....	.....	.....	.....	.....
Alpha	.....	.....	.....	.....	.....	.....
Alta	2.50	2.25	2.50	3.00	3.37½	.....
Argenta	.....	.....	.....	.....	.....	.....
Bechtel	.....	.....	.....	.....	.....	.....
Belcher	.....	.....	.....	.....	.....	.....
Belle Isle	.....	.....	.....	.....	.....	.....
Best & Belcher	8.37½	8.12½	8.00	9.12½	8.25	.....
Bodie	2.50	.....	2.50	2.62½	2.62½	.....
Bulwer	1.50	1.50	1.12½	1.25	1.37½	.....
Chollar	4.75	4.37½	5.25	5.00	4.50	.....
Con. Cal. & Va.	26.00	23.00	22.00	23 50	21.00	.....
Con. Pacific	.....	.45	.35	.30	.30	.....
Crown Point	4.00	3.25	4.37½	5.50	5.00	.....
Eureka Cons	4.75	4.87½	4.75	4.75	.....	.....
Gould & Curry	.....	3.62½	4.00	5.12½	4.75	.....
Grand Prize	.....	.....	.....	.....	.....	.....
Hale & Norcross	3.75	3.37½	4.00	4.12½	3.87½	.....
Martin White	.....	.....	.....	.....	.....	.....
Mexican	5.37½	4.50	5.37½	6.00	5.25	.....
Mono	2.87½	2.62½	3.00	2.75	2.62½	.....
Mount Diablo	3.50	3.75	3.50	.....	3.50	.....
Navajo	.75	... ..	.75	.80	1.00	.....
Northern Belle	.....	.....	.....	.....	.....	.....
North Belle Isle	.....	.....	.....	.....	.....	.....
Ophir	11.50	10.25	10.00	12.75	12.00	.....
Potosi	7.00	6.12½	6.75	7.25	7.00	.....
Savage	9.50	8.25	8.12½	8.37½	9.12½	.....
Scorpion	.....	.....	.....	.....	.....	.....
Sierra Nevada	4.25	4.25	5.00	5.25	4.62½	.....
Sutro Tunnel	.....	.....	.....	.....	.....	.....
Tip-Top	.....	.....	.....	.....	.....	.....
Union Cons	3.75	3.12½	3.75	4.37½	3.87½	.....
Utah	5.50	5.50	5.12½	7.00	6.50	.....
Yellow Jacket	4.50	4.00	7.75	6.37½	7.25	.....

ASSESSMENTS.

COMPANY.	No.	When levied.	Delinquent in office.	Day of sale.	Amount.
Caledonia, Nev	...	Nov. 26	.....	.....	.15
Chollar, Nev	22	Nov. 16	Dec. 21	Jan. 13	.50
Comstock & Belfast, Dak	2	Nov. 8	*Dec20	*Jan. 6	¾
General Crook, Dak.	2	Oct. 9	Jan. 14	Jan. 31	½
Golden Fleece, Cal..	7	Nov. 22	Dec. 27	Jan. 15	.10
Gorilla, Cal	4	Nov. 26	Dec. 31	Jan. 21	.06
Hailey Hill	...	Nov. 24	Dec. 29	Jan. 17	.01
Hotspur, Dak	2	Nov. 22	Jan. 24	Feb. 11	½
John Duncan, Mich..	....	Nov 24	Dec. 24	Dec 24	.25
Lockport. Dak	2	Sept. 16	Oct. 16	*Jan. 19	¼
Maryland & Charlotte	...	Nov. 29	Feb. 1	Feb. 1	.05
May Flower, Cal	33	Nov. 17	Dec. 22	Jan. 17	.25
McDonnell, Dak	1	Nov 20	Dec. 24	Jan. 13	¼
North Sierra, Nev	4	Nov. 26	Jan. 8	Jan. 29	.20
One Thousand and One Cons., Cal	21	Nov. 22	Dec. 27	Jan. 17	⅛
Ophir, Nev.	....	Dec. 15	.....	.....	.50
Orleans Cons, Nev	1	Dec. 6	Jan. 12	Feb. 2	.05
Peer, Ariz	6	Nov. 16	Dec. 22	Jan. 17	.10
Peerless, Ariz	9	Nov. 16	Dec. 23	Jan. 17	.20
Phœnix Cons., Cal	1	Dec. 6	Jan. 10	Jan. 31	.60
Pilot Peak, Cal	14	Oct. 11	Nov. 22	Dec 27	.01
Pocahontas, Dak	2	Sept. 27	*Dec. 1	*Dec 27	.01
Polar Star, New Mex.	1	Nov. 17	Dec. 31	Jan. 15	.07
Potosi, Nev	26	Nov. 10	Dec. 14	Jan. 4	.30
Ruby Bell, Dak	1	Nov. 4	Dec. 15	Dec. 31	¼
San Luis Cons., Cal..	7	Nov. 30	Dec. 31	Jan. 15	⅛
Scorpion, Nev	20	Nov. 12	Dec. 17	Jan. 7	.10
Sierra Iron, Cal	5	Nov. 11	Dec. 29	Jan. 25	2.50
South Fork, Cal	4	Nov. 1	Dec. 1	Jan. 1	1.00
Spring Valley, Cal	1	Oct. 19	Dec. 3	Jan. 3	.25
Summit, Cal	9	Nov. 29	Dec. 29	Jan. 18	.10
Talulah, Nev	21	Oct. 30	Dec. 8	Dec 29	.30
Tuscarora Tun'l, Nev.	....	Nov. 4	Dec 15	Jan. 10	7.50
Tyrolese, Idaho	....	Oct. 23	Nov. 30	Dec. 28	.15
Union Cons., Nev	34	Nov. 3	Dec. 7	Dec 28	.25
Utah, Nev	54	Nov. 20	Dec. 24	Jan. 19	.50
West Galena, Dak	5	June 5	*Dec. 30	*Jan. 17	½

* The delinquent day and the day of sale were postponed to dates given above.

fire," owing to an entire lack of speculative interest. Later, we expect to see better prices; but now, owing to the entire absence of outsiders, there is no use to buy it and pay storage charges.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Dec. 18	69c.	69⅜c.	68⅛c.	69⅛c.	1,318,000
20	69¼	69¼	67¾	68	1,963,000
21	67½	68⅛	65⅝	66¾	3,148,000
22	67	67⅛	66	66¼	1,789,000
23	66⅜	66¾	66⅛	66⅝	1,115,000
24	....	....	....	....	.....
Total sales in barrels					9,333,000

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, Dec. 22.

Since our last report, the market for mining stocks has relapsed into extreme dullness and inactivity, incident to the closing of the year and the collapse in the general market for all kinds of stock last week, and we do not look for much improvement until after the holidays. There has been less decline in copper stocks than in railroad and general mining shares, and prices have been well maintained, especially in the dividend-paying mines; but the speculative list has suffered from the extreme dullness and indisposition to trade in it. We still look for an active and rising market during the early new year.

Calumet & Hecla is in better demand, and has advanced on light transactions from $211@$216, with later sales at $215; less than one hundred shares have been traded in, and there is no pressure to sell. Quincy improved from $54@$56, and is in good demand at these prices, with but little offering. Franklin sold, ex dividend $1, at $13¾, which is about the same as the closing price of last week, but very little stock could be bought at this price. Osceola was quite firm and steady at $26@$26½, on sales of about 250 shares. Allouez, dull but steady at $2@$2⅛. National sold at $1 for a small lot and $1.30 for 200 shares. The remainder of the list was neglected.

In silver stocks, Boston & Montana declined from $5¾@$5. Catalpa sold at 35@30c. Napa Quicksilver, steady at $1⅛@$1.15. Bonanza declined to $1⅛.

St. Louis Mining Stocks. Dec. 21.

[From our Special Correspondent.]

The only features of our market for the past week are the strength shown by good stocks, and the weakness, and neglect of stocks classed as "fancies." Granite Mountain has been as firm as granite, with buyers for stock at constantly increased values. Sellers are scarce, however, notwithstanding the advance, and every 100 shares sold almost invariably bring a higher figure than the sale made previous to it. We quote this stock at $52½ a share at the close, with the indications pointing to higher figures in the near future. Small Hopes has also ruled at higher prices, having sold at $9.50 a share. The reason for the strength is owing to the declaration of a 40-cent dividend for the month. Adams, notwithstanding the declaration of the usual dividend, has ruled at lower figures, selling down to $5.75 a share.

NAME OF COMPANY.	Location.	Bid.	Asked.
Adams, s. L	Colo	$6.00	$6.50
Bi-Metallic, s	Mont	.....	.....
Cen. Continental, G. s.	Ark	.....	.....
Consolidated Silver, s.	Mo	.....	.....
Courtland	Colo	.....	.25
Dandy, s	Colo	.....	.....
Durango, T	Mex	.....	.....
Grand Duke	Colo	.....	.....
Granite Mountain, s	Mont	52.50	53.00
Hope, s	Mont	50 00	.....
Ideal, s. L	Colo	1.05	1 10
Iron Gold and Silver	N. Mex	.....	.35
Laclede	N. Mex	.....	.35
Peacock	N. Mex	2.90	3.00
Puritan	Colo	.....	.....
Quincy	Colo	.10	.12½
Sheridan	N. M	2.70	2.75
Small Hopes Cons., s. L.	Colo	9.00	9.50
St. Louis & Mex. Imp.	Mex	1.70	1.80
St. Louis & San Fran	Mex	.....	.....
St. Louis & Sonora, G. s.	Mex	.....	.20
St. Louis & St. Elmo	Colo	.....	.40
St. Louis & Yavapai	Ariz	.85	.95
West Granite, s	Mont	.....	.....

FREIGHTS.

The latest actual charters to December 23d, per ton of 2240 pounds:

To	From Philadelphia	From Baltimore.	From New York shipping ports.
Alexandria	.75	.....	.....
Annapolis	.65	.....	.....
Baltimore	.60§	.....	.....
Bangor	1.05*	1.40	.85*
Bath, Me	1.05*	1.30	.85*
Beverly	1.05*	.....	.83*
Boston, Mass	1.25*	1.25@1.30	.83*
Bridgeport, Conn.	.....	1.10	.70
Bristol	.....	1.15	.80
Brooklyn	.....	1.00	.25§
Cambridge, Mass.	1.05*	.....	.83 3*
Cambridgeport	1.05*	.....	.83 3*
Charleston, S. C.	.85	.80	.85*
Charlestown	1.25*	.....	.85 3*
Chelsea	1.05*	.....	.83*
City Point	.....	.....	.83*
Com. Pt., Mass.	1.05*	.....	.83*
E. Boston	1.25*	.....	.83*
East Cambridge	1.05*	.....	.83* 3c.
E. Gr'nwich, R. I.	.....	.....	.85
Fall River	.90*	1.00	85
Galveston	2.25@2.50	2.40	.....
Gardner	1.05*¶	1.15	.....
Georgetown, D.C.	.75	.....	.....
Gloucester	1.05*	.....	.....
Hoboken	.....	.95	.....
Jersey City	.....	.95	.....
Lynn	1.25*	1.40	1.35
Marblehead	1.10*	.....	.....
Milton	1.15*	1.30	.....
Newark	.....	1.40	.....
New Bedford	.90@.95*	1.00	.90
New-Berne	.75	.....	.....
Newburyport	1.20*	1.30	1.00*
New Haven	.....	1.10	.70
New London	.....	1.10	.75
New Orleans	2.00	.....	.....
New York	.90§	1.00	.25§
Newark, N. J	.....	1.15¶	.....
Newport	.90*	.....	.80
Norfolk, Conn	.60	.....	.65
Norfolk, Va	.60	.....	.....
Norwich	.....	1.25¶	.80
Norwalk, Conn	.....	.....	.70
Pawtucket	.....	.....	.75¶
Portland, Me	1.00*	1.25	.85*
Port Royal, S C.	.80	.....	.....
Portsmouth, N.H.	1.15*	1.35	.95*
Portsmouth, Va.	.60	.....	.....
Providence, R. I.	1.00*	1.10	.85
Quincy port	1.05*	.....	1.10
Richmond, Va	.75	.....	.....
Rockport	1.10*	.....	.....
Roxbury, Mass.	1.05*	.....	.....
Saco	1.10†	1.60§	.....
Salem, Mass.	1 25*	1.25	85*
Savannah	.90	1.05	.....
Somerset	.90*	1.00	.75
Washington	.75	1.00	.....
Williamsb'g, N.Y.	.....	1.00	.....
Wilmington, Del.	.80	1.00	.....
Wilmington, N.C.	.85@.90	1.00	.....

* And discharging. † And discharging and towing. 3c. per bridge extra. § Alongside. ‖ And towing up and down. ¶ And towing. †† Pilotage. ** Below bridge. *** Old B. L.

FOR SALE.

ONE 8 × 12 AIR-COMPRESSOR, RAND DRILL CO

Used but short time; in excellent condition. Address

PORTER MFG. CO. (Limited),

Syracuse, N. Y.

CONTRACTS OPEN.

139 MACHINERY AND SUPPLIES—PROPOSALS will be received by the Piedmont Reduction Company, of North Carolina, 115-123 Chestnut Street, Newark, N. J., for the following articles: Fire-bricks and tiles, fire-clay, red bricks, lime, and cement, ore-breaker and crushing-rolls, edge-runner mixing mill, iron-work for water-jacket blast-furnace, blower and air pipes, slag-pots, molds, and tools, blacksmith's forge and tools.

151 INCANDESCENT ELECTRIC LIGHTING Plants—Proposals will be received by the Commissioners for Hospitals for Insane, Governor's Office, Indianapolis, Ind., until January 4th, for three (3) incandescent electric lighting plants of about 600 lights each.

153 STONE AND BRICK-WORK—PROPOSALS will be received by the Supervising Architect, Washington, D. C., until January 3d, 1887, for all the stone-work and brick-work of the superstructure of the extension of the Court-House, etc., at Des Moines, Ia.

154 DREDGING—PROPOSALS WILL BE received by Capt. W. H. Bixby, U. S. Engineers, Wilmington, N. C., until January 4th, 1887, for dredging in Cape Fear River, N. C.

155 WATER-WORKS—PROPOSALS WILL be received by Ed. J. Mastin, Mayor, Huntsville, Ala., for 1000 feet of 8-inch pipe and about 6000 feet of 6-inch pipe, engine for pumping water, and building a new reservoir.

156 ANTHRACITE COAL—PROPOSALS will be received by C. W. Foster, Depot Quartermaster's Office, St. Louis, Mo., until January 5th, 1887, for 180,000 pounds of Anthracite Coal (Locust Mountain Colliery, Pa.), required between February 1st and June 30th, 1887.

157 STONE AND COAL—PROPOSALS WILL be received by Capt. W. H. Bixby, U. S. Engineer Office Wilmington, N. C., until January 8th, for 2000 tons stone, to be delivered at Beaufort Harbor, N. C., and 800 tons of coal.

158 HOISTING-ENGINE — PROPOSALS will be received by Capt. W. H. Bixby, U. S. Engineers, Wilmington, N. C., until January 8th, for one hoisting engine, to be delivered on the Neuse River, at Kinston, N. C.

160 DREDGING—PROPOSALS WILL BE received by William F. Smith, U. S. Engineer Office, 1112 King street, Wilmington, Del., until December 30th, for dredging Nanticoke River and St. Jones River, Delaware

161 WATER-WORKS—PROPOSALS WILL be received by Emil Baensch, City Clerk, Manitowoc, Wis., until January 15th, for the construction and maintenance of a system of water-works (direct pressure and stand-pipe combined) in Manitowoc, on the basis of about ten miles of pipe, and one hundred and twenty-five hydrants.

162 WATER-WORKS—PROPOSALS WILL be received by the Board of Water Commissioners, Muskegon, Mich., until January 12th, for the putting up of pumping machinery of two million gallons capacity, and the removal of the old pumping machinery to the new station, and the furnishing of all necessary mains, valves, specials, etc., and competitive plans and specifications for a system of water-works sufficient for the supply of good, pure water to the amount of five million gallons per day of twenty-four hours and sealed proposals for the construction of necessary works, the supply of necessary mains, valves, specials, etc.

163 CAST-IRON WATER-PIPE, VALVES and Hydrants—Proposals will be received by J. W Henion, Superintendent and Secretary Board of Water Commissioners, Minneapolis, Minn., until January 6th, for furnishing cast-iron water pipe, specials, valves, and hydrants, on board cars at the foundries; also free on board cars at Minneapolis, Minn

Important Opportunity.

FOR SALE.—State rights to use the Bietrix Briquette Machinery. By this process, coal-dust, now largely worthless, is so prepared that, by mixing with it about 5 per cent of coal-tar, a fuel superior to lump coal is produced and made into bricks weighing about 2 lbs., 6 lbs., 11 lbs., or 22 lbs. each. These bricks or briquettes are used for domestic purposes, locomotives, steamers, blast-furnaces, etc., with great success.

The actual cost in many cases ought not to exceed the following for an output of 100 tons in 20 hours:

Office expenses per ton Briquettes	.04
Depreciation and interest	.05
Repairs, oil, etc	.03
Labor	.10
Coal-dust	.10
Tar	.30
Total cost per ton	.62

Where the dust is not made into briquettes at the coal mine, cost of freight on it must be added.

Capacity of plants vary from 100 to 300 tons in 2 hours and they cost from about $18,000 to $30,000 erected.

Nearly 80 of these machines are in use in Europe, and the names of all the buyers will be given.

The total capacity of the Bietrix system has grown from nothing in 1878 to nearly 3,500,000 tons yearly in 1886. Some firms have a number of these plants, and make 200,000 tons and upward yearly. In many cases, parties buy the coal-dust and make the briquettes for general sale; in other cases, the plants have been taken by coal-mine owners themselves, or by railroads, etc. The briquettes are superior to lump coal, and do not deteriorate so much when exposed to the weather. A large field and handsome profits in this business await enterprising parties in this country. Address agency,

V. Bietrix & Co.,

Room 22, 8th Floor, Mills Building, New York City.

P. S.—Parties also wanted to manufacture the above. Each plant, with motive power, weighs from about 50 to 120 tons, according to size. A SPECIAL OPPORTUNITY will be given the first parties who purchase a plant for use in the United States.